NAVAER 16-30ARC27-503

Handbook
Overhaul Instructions

RADIO SET
AN/ARC-27
AN/ARC-27A

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PUBLISHED UNDER AUTHORITY OF THE CHIEF OF THE BUREAU OF AERONAUTICS

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15 April 1955
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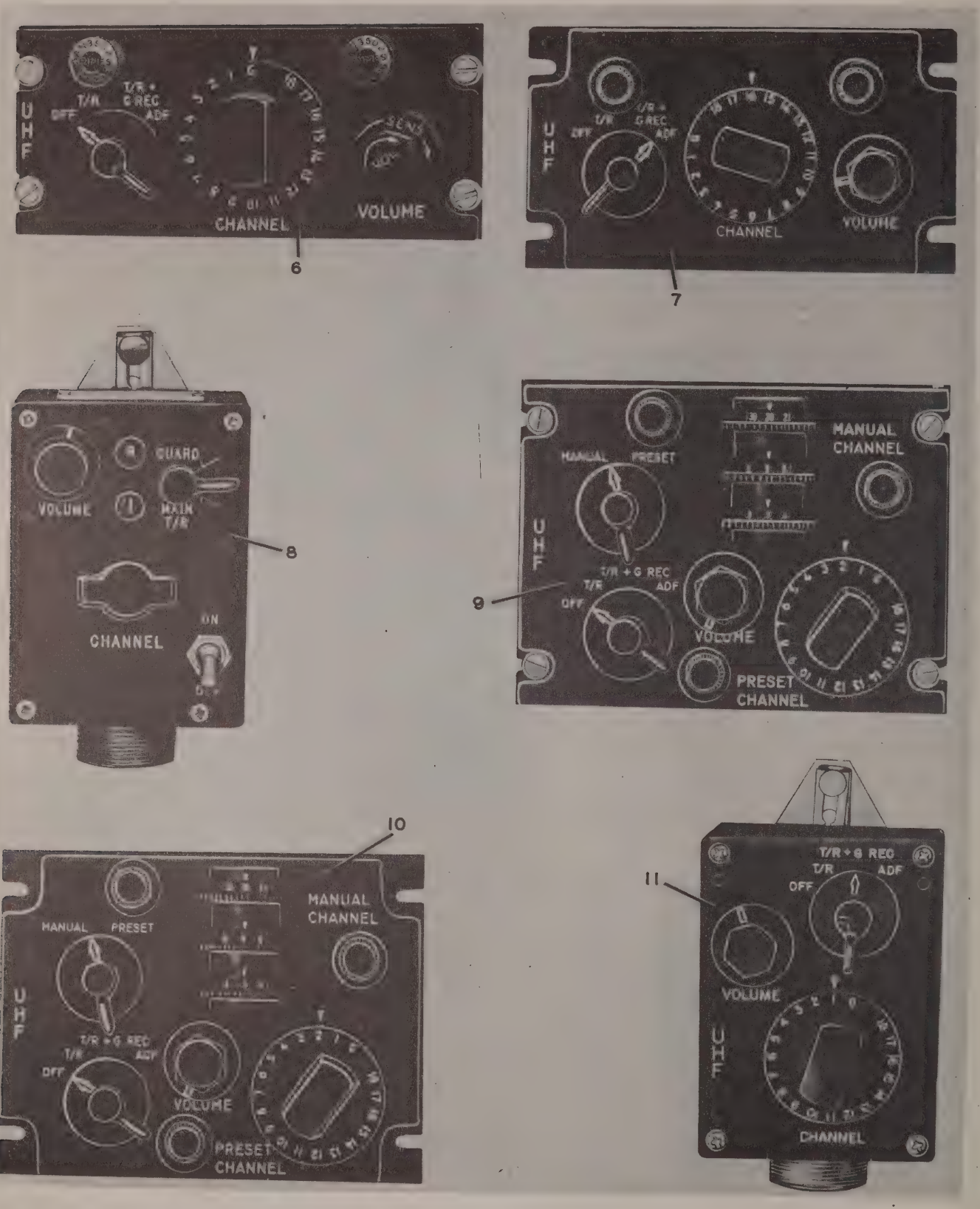
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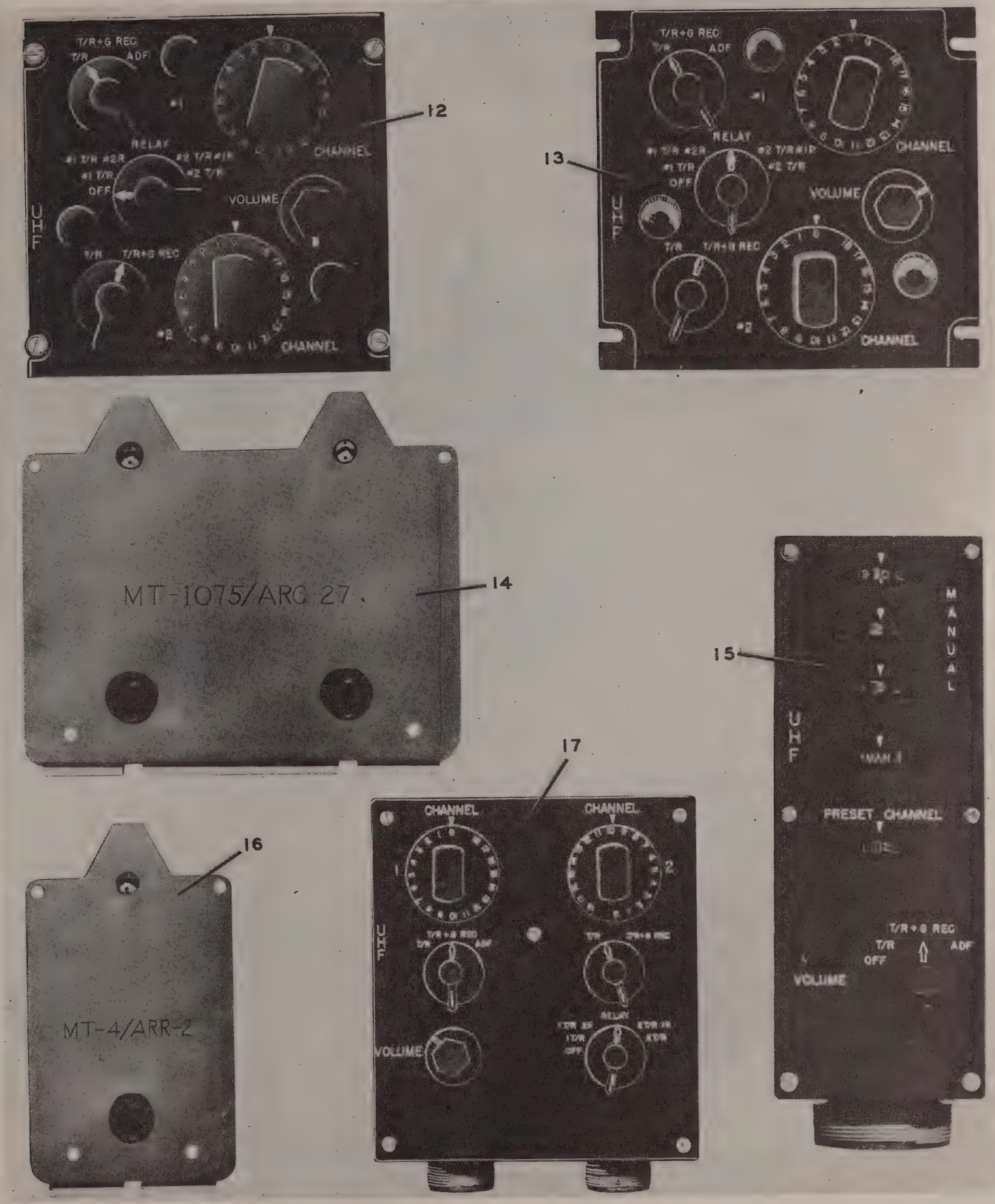
1. Receiver-Transmitter RT-178/ARC-27
2. Mounting MT-822/ARC-27
3. Radio Set Control C-626/ARC-27
4. Mounting MT-821/ARC-27
5. Radio Set Control C-628/ARC-27

Figure 1-1. Radio Set AN/ARC-27 (Sheet 1 of 4)



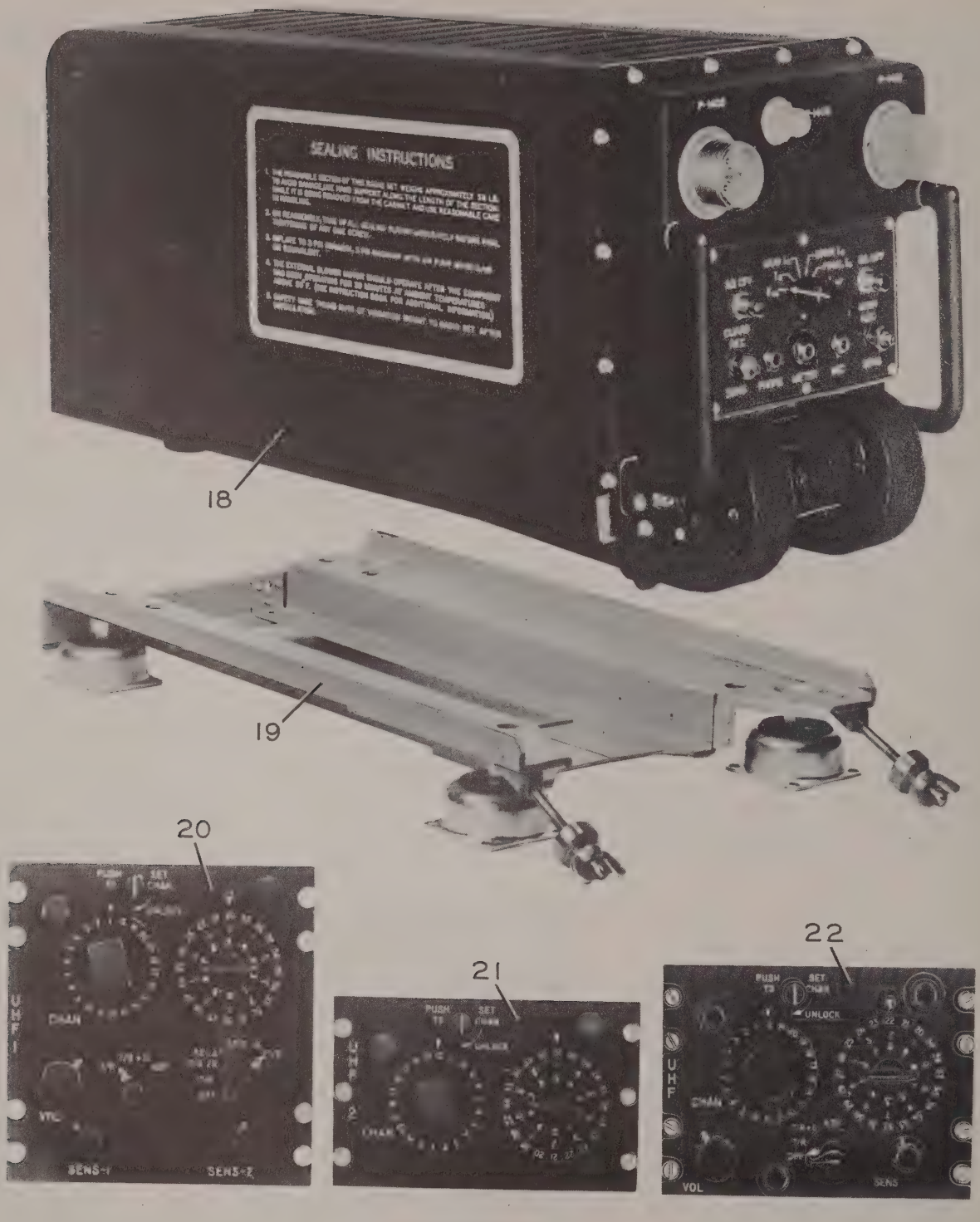
6. Radio Set Control C-628A/ARC-27
7. Radio Set Control C-868/ARC-27
8. Radio Set Control C-627/ARC-27
9. Radio Set Control C-905/ARC-27
10. Radio Set Control C-906/ARC-27
11. Radio Set Control C-911/ARC-27

Figure 1-1. Radio Set AN/ARC-27 (Sheet 2 of 4)



12. Radio Set Control C-853/ARC-27
13. Radio Set Control C-913/ARC-27
14. Mounting MT-1075/ARC-27
15. Radio Set Control C-912/ARC-27
16. Mounting MT-4/ARR-2
17. Radio Set Control C-914/ARC-27

Figure 1-1. Radio Set AN/ARC-27 (Sheet 3 of 4)



NOTE

Radio Set Controls C-1703/ARC-27A, C-1704/ARC-27A, and C-1705/ARC-27A are identical to Radio Set Controls C-1015/ARC-27A, C-1024/ARC-27A, and C-1025/ARC-27A respectively, except as noted in Difference Data Sheet, Section XII.

18. Receiver-Transmitter RT-178/ARC-27
19. Mounting MT-822/ARC-27
20. Radio Set Control C-1024/ARC-27A
21. Radio Set Control C-1025/ARC-27A
22. Radio Set Control C-1015/ARC-27A

Figure 1-1. Radio Set AN/ARC-27A (Sheet 4 of 4)

INTRODUCTION

This overhaul handbook is prepared for use by Overhaul and Repair Departments (Bureau of Aeronautics) and Depots (Department of the Air Force) as an aid in understanding and performing service and maintenance procedures for Radio Sets AN/ARC-27 and AN/ARC-27A. Repair, replacements, adjustments, and recalibration data for the electronic equipment is limited to that which is beyond the capabilities of organizational and field maintenance personnel. Reference is made to publication NAVAER 16-30ARC27-502, Handbook of Service Instructions, Radio Set AN/ARC-27 and AN/ARC-27A, for all installation, maintenance, and service procedures not found in this handbook. For information concerning any detail part in this equipment, reference is made to publication NAVAER 16-30ARC27-501, Illustrated Parts Breakdown, Radio Set AN/ARC-27 and AN/ARC-27A. This handbook is compiled and printed in accordance with Specifications MIL-H-6814A (ASG) and MIL-H-5474A, and conforms to applicable portions of the following specifications:

JAN-STD-15	Electrical and Electronic Symbols
MIL-STD-16	Electrical and Electronic Reference Designations
MIL-STD-122	Color Code for Chassis Wiring for Electronic Equipment
ANA 261	Abbreviations and Contractions; Approved List of

SECTION I
DESCRIPTION AND LEADING PARTICULARS

1-1. SCOPE OF HANDBOOK.

1-2. This publication comprises overhaul instructions for Radio Set AN/ARC-27 and Radio Set AN/ARC-27A, manufactured and supplied by the Collins Radio Company, Cedar Rapids, Iowa, under Contracts NOas 10444, 10977, 12161, 51-284, 51-285, 51-618, 51-619, 51-620, 51-1155, 52-320, 52-349, 52-742, 52-1045, 52-1115, 53-267, 53-293, 53-413, and 53-896. Sections I through XI of this handbook apply to Radio Sets AN/ARC-27 and AN/ARC-27A. Additional models will be covered in Section XII by the use of difference data sheets.

1-3. PURPOSE AND APPLICATION OF EQUIPMENT.

1-4. Radio Set AN/ARC-27 and Radio Set AN/ARC-27A have been designed primarily to provide two-way amplitude-modulated voice radiotelephone communication between aircraft in flight, aircraft and ship, and aircraft and shore. Either radio set is capable of providing transmission and reception on any one of 1750 frequency channels, spaced 100 kilocycles apart, in the band of 225.0 to 399.9 megacycles. It is also possible to monitor one predetermined frequency, known as a guard channel, located in the 238.0 to 248.0 megacycle band. The control units associated with the equipment permit the manual selection of any frequency within the equipment frequency range, or, in AN/ARC-27 equipment, the selection of one of eighteen preset channels, or, in AN/ARC-27A equipment, the selection of one of twenty preset channels. The transmitter portion of Radio Set AN/ARC-27 may be tone modulated (A-2) with a 1020 cps continuous tone signal, generated within the equipment, for emergency or direction finder purposes. Tone transmission is not provided in Radio Set AN/ARC-27A. Transmission and reception in both equipments utilize the same frequency and is accomplished with a single common antenna. The AN/ARC-27 equipment consists of Receiver-Transmitter RT-178/ARC-27, Mounting MT-822/ARC-27, and applicable radio set control units with associated mountings, illustrated in figure 1-1. Radio Set AN/ARC-27A consists of Receiver-Transmitter RT-178/ARC-27, Mounting MT-822/ARC-27, and Radio Set Control C-1015/ARC-27A, or C-1024/ARC-27A and C-1025/ARC-27A, illustrated in figure 1-1.

1-5. AUXILIARY APPLICATION OF EQUIPMENT.

1-6. When installed with certain accessories, the equipment is designed for use as an automatic direction finding (ADF) facility. When used for this service, the Receiver-Transmitter RT-178/ARC-27 will receive radio frequency signals from the direction finding antenna, amplify and demodulate the signals, and deliver the low-frequency modulation components to the direction finder amplifying and indicating equipment. The ADF and homing operations are in conjunction with Direction Finder Group AN/ARA-25.

1-7. When installed with the necessary control units and accessory equipment, two RT-178/ARC-27 Receiver-Transmitters may be connected in such manner that an incoming signal received on one unit will be automatically relayed and retransmitted from the second unit on an alternate frequency. In this type of automatic relay operation, the two transceivers are connected so that reception of a signal on the frequency to which either transceiver is tuned, will result in retransmission of the signal on the frequency to which the other transceiver is tuned. When used for this service, each RT-178/ARC-27 must be equipped with a separate antenna. Incoming signals may be automatically relayed in either direction, but not simultaneously since the carrier of each transmitter is actuated by the squelch circuit of the other receiver.

1-8. GENERAL DESCRIPTION. A complete description of the Receiver-Transmitter RT-178/ARC-27 and all associated radio set controls of the AN/ARC-27 and AN/ARC-27A equipment will be found in Section I of the Handbook of Service Instructions.

NOTE

Information contained in publication NAVAER 16-30ARC27-502, Handbook of Service Instructions, will not be repeated in this publication except where required for clarity.

SECTION II
TEST EQUIPMENT AND SPECIAL TOOLS

2-1. SPECIAL TEST EQUIPMENT.

2-2. No special test equipment is required to perform overhaul procedures outlined in this instruction manual. All test equipment required for service and maintenance of Radio Sets AN/ARC-27 and AN/ARC-27A is listed in Section II of the Handbook of Service Instructions. All test equipment used is normally supplied to overhaul activities. In addition, those Overhaul and Repair Departments and Depots which have been supplied with Test Bench Cable Kit MK-128/ARC-27 should refer to publication AN 16-35MK128-1 for operation and maintenance instructions.

2-3. SPECIAL TOOLS.

2-4. There are no special tools, fixtures, or jigs required for the overhaul procedures described in this handbook which are not listed in Section II of the Handbook of Service Instructions, Radio Sets AN/ARC-27 and AN/ARC-27A, or Section I of the Handbook of Operation and Maintenance Instructions, Test Bench Cable Kit MK-128/ARC-27.

SECTION III
MAINTENANCE BEYOND CAPABILITIES OF FIELD

3-1. INTRODUCTION.

3-2. This section contains service data to enable Overhaul and Repair Departments (Navy) and Depot (Air Force) facilities to perform specialized maintenance and to repair electronic and electromechanical components of the equipment which are beyond the capabilities of field facilities. The section provides instructions for the dismantling and reassembly of Radio Set Control C-626/ARC-27 (Autotune), Radio Set Control C-1015/ARC-27A, and the Mechanical Drive Subassembly (Autopositioner) which are not normally completely dismantled during regular overhaul procedures.

3-3. Trouble isolation in this section supplements or makes reference to data found in the Handbook of Service Instructions. When performing maintenance work on the Autotune or Autopositioning mechanisms, reference should be made to Section IV of the Handbook of Service Instructions for a detailed explanation of the theory of operation for the control system. Before starting any of the specialized maintenance procedures in this section, a suitable performance check, Section V (paragraph 5-4) and Section VI (paragraph 6-4) of the Handbook of Service Instructions, should be performed to determine the operating condition of the components involved.

3-4. REMOVAL AND REPLACEMENT OF SPECIAL PARTS.

3-5. MECHANICAL DRIVE SUBASSEMBLY OF THE RECEIVER-TRANSMITTER RT-178/ARC-27.

3-6. In order to facilitate replacement of any part contained in the mechanical drive unit, a complete disassembly procedure is outlined below. Reference should be made to figure 3-6, exploded view, and illustrations listed in the procedure. Extreme caution must be used when disassembling the Mechanical Drive Subassembly to prevent loss of small parts, washers, and gears. Always provide several containers to hold minute parts, screws, washers, and hex nuts before starting the disassembly procedure.

NOTE

Considerable time should be spent in trouble shooting and adjustment procedures before attempting to disassemble a component to correct a malfunction. In most cases, trouble can be corrected by adjustment procedures and intelligent application of operational theory. If trouble is known to exist in a detail part, or a small assembly of parts, which is not readily accessible, the following disassembly and reassembly instructions are supplied as a step-by-step guide to completely dismantle the Mechanical Drive Subassembly. These instructions are not to infer that a unit should be regularly disassembled, since the operation will disturb factory aligned adjustments and reassembly procedures must be strictly observed.

3-7. DRIVE MOTOR REMOVAL AND REPLACEMENT.

a. Place the Mechanical Drive Subassembly so that the relays are up. Refer to figure 3-1.

b. Remove the phenolic terminal board, E-1202, by removing the two glyptal staked screws. It may be necessary to heat the screw slightly, using a soldering iron, to loosen the glyptal.

c. Remove the triangular mounting plate (A-1201), to which power connector J-1214 is attached, by removing the three #4 Phillips head screws. The receptacle mounting bracket need not be removed if the cable can be folded back out of the way.

d. Remove gears O-1225 and O-1226, which become accessible when the triangular mounting plate is removed (see figure 3-3). Since the associated ball bearings are no longer held captive, they should be removed from the mounting plates to prevent accidental loss.

e. Remove the drive motor wires, coded solid red and solid black, from the standoff insulated binding posts E-1205 and E-1203.

f. Remove the three mounting screws from the front (gear end) of the motor and lift the motor from the subassembly, threading the wires through the insulating sleeving.

g. The drive motor is replaced by reversing the above procedure. No special alignment or adjustment procedures are required.

3-8. K-1201 CLUTCH ASSEMBLY REMOVAL AND REPLACEMENT.

a. Loosen the clamp holding gear O-1216 to the shaft connected to switches S-1201 and S-1202. Slide the gear down the shaft out of the way.

b. Remove gear O-1217, located on the shaft of the clutch assembly and meshing with gear O-1216, by knocking out the tapered pin which holds it to the shaft. The pin must be driven out large end first. Damage to the gear will result if the pin is driven the wrong way. The gear can be rotated by depressing the clapper on relay K-1201 and turning the motor gear train by hand.

c. Remove the three screws holding the relay mounting plate to the hexagonal standoffs.

d. Lift relay and clutch assembly up. If relay is to be replaced, the three connecting wires should be tagged and removed, and resoldered to the same terminals on the new relay.

e. If assembly has been removed for clutch maintenance, refer to paragraph 3-13.

f. A new taper pin, if available, should be used to secure gear O-1217 to the shaft.

NOTE

Observe that the hole in the shaft and the hole in the gear are tapered. When assembled, the larger opening on the gear must line up with the larger opening in the shaft so that the taper is continuous through the gear and shaft.

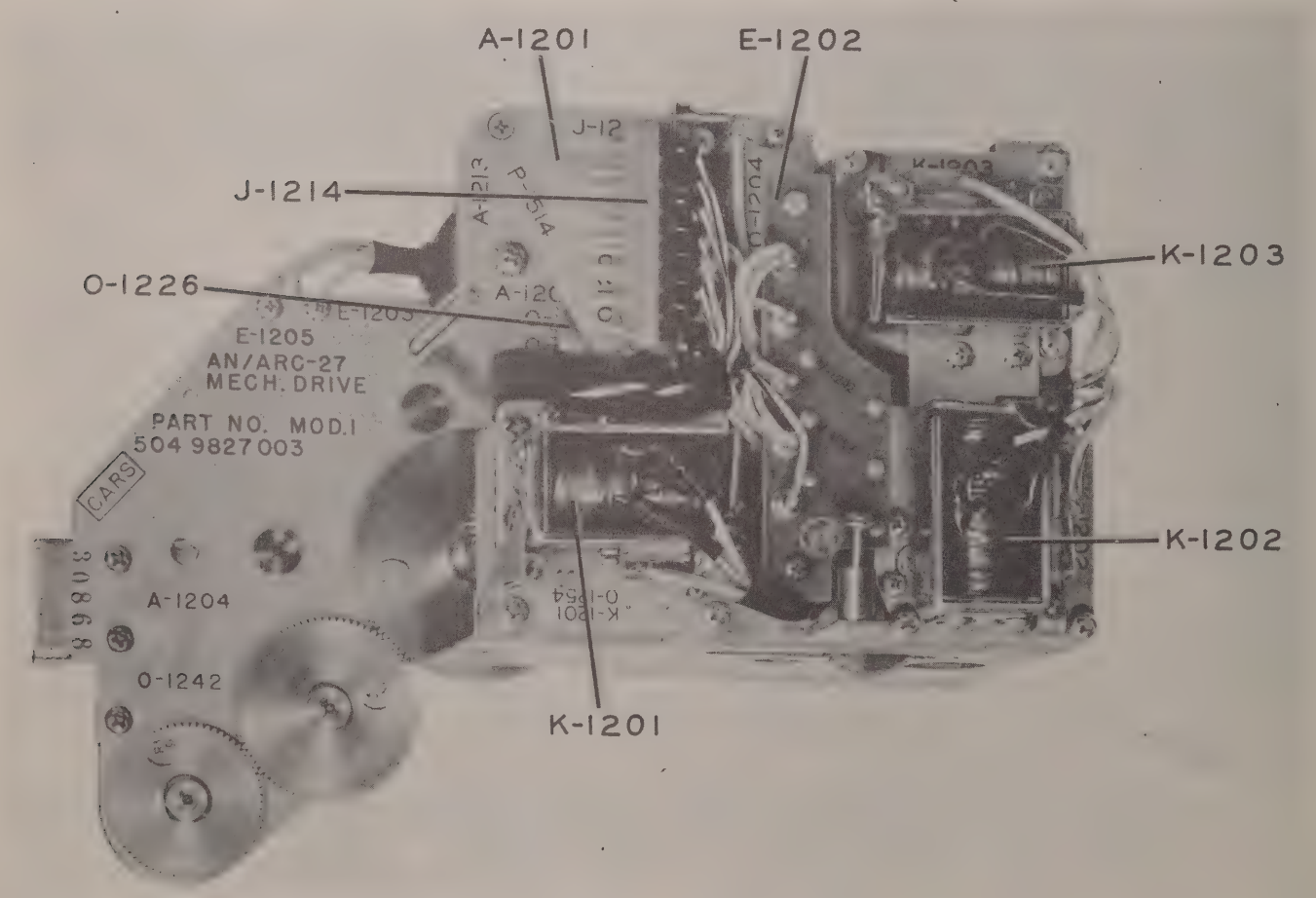


Figure 3-1. Mechanical Drive Subassembly, Left Side View

g. With the precautions noted in step f, replacement of the clutch assembly is accomplished by reversing the disassembly procedure.

3-9. K-1202 CLUTCH ASSEMBLY REMOVAL AND REPLACEMENT.

a. Remove the differential coupler arm spring O-1209 (figure 3-4).

b. Depress clapper on relay K-1202 and turn motor gear train by hand until cam is not hidden behind 20-30 megacycle i-f drive gear.

c. Remove the three screws holding the relay mounting plate to the hexagonal standoffs. Remove and tag the three wires to the relay terminals.

d. Lift complete clutch assembly, including cam, up and out through the access hole. It is not necessary to loosen clamp holding cam to shaft.

e. The relay and clutch assembly is replaced by reversing the disassembly procedures. It is not necessary to attempt to synchronize while assembling, since this operation is performed separately, refer to paragraph 3-16.

3-10. K-1203 CLUTCH ASSEMBLY REMOVAL AND REPLACEMENT.

a. Remove the three screws holding the relay K-1203 mounting plate to the hexagonal standoffs. Remove and tag the three wires to the relay terminals.

b. Lift the clutch assembly straight up and out of the unit. The shaft used to turn switches S-1205 and S-1206 is not anchored at the crystal socket board. Do not turn switches S-1205 or S-1206 while the shaft is removed.

c. When replacing the assembly, the shaft should be inserted in the switch wafers in exactly the same manner as it was positioned before removal. Replace the relay mounting plate on the hexagonal standoffs and proceed with synchronization, paragraph 3-16.

3-11. RELAY REMOVAL AND REPLACEMENT.

a. Unsolder the three wires connecting the relay to be removed.

b. Remove the three screws holding the relay to the mounting plate.

c. Lift relay from the mounting plate.

d. Remove screws holding relay mounting bracket to relay and install mounting bracket on new relay.

e. When installing new or repaired relay on mounting plate, note the proper relationship between the relay actuator arm, the pawl arm extension, the relay contacts, and the pawl return spring. The pawl arm extension must go between the relay actuator arm and the pawl return spring for proper operation.

3-12. RELAY ADJUSTMENT.

a. Set pawl arm tip on top of a tooth by depressing

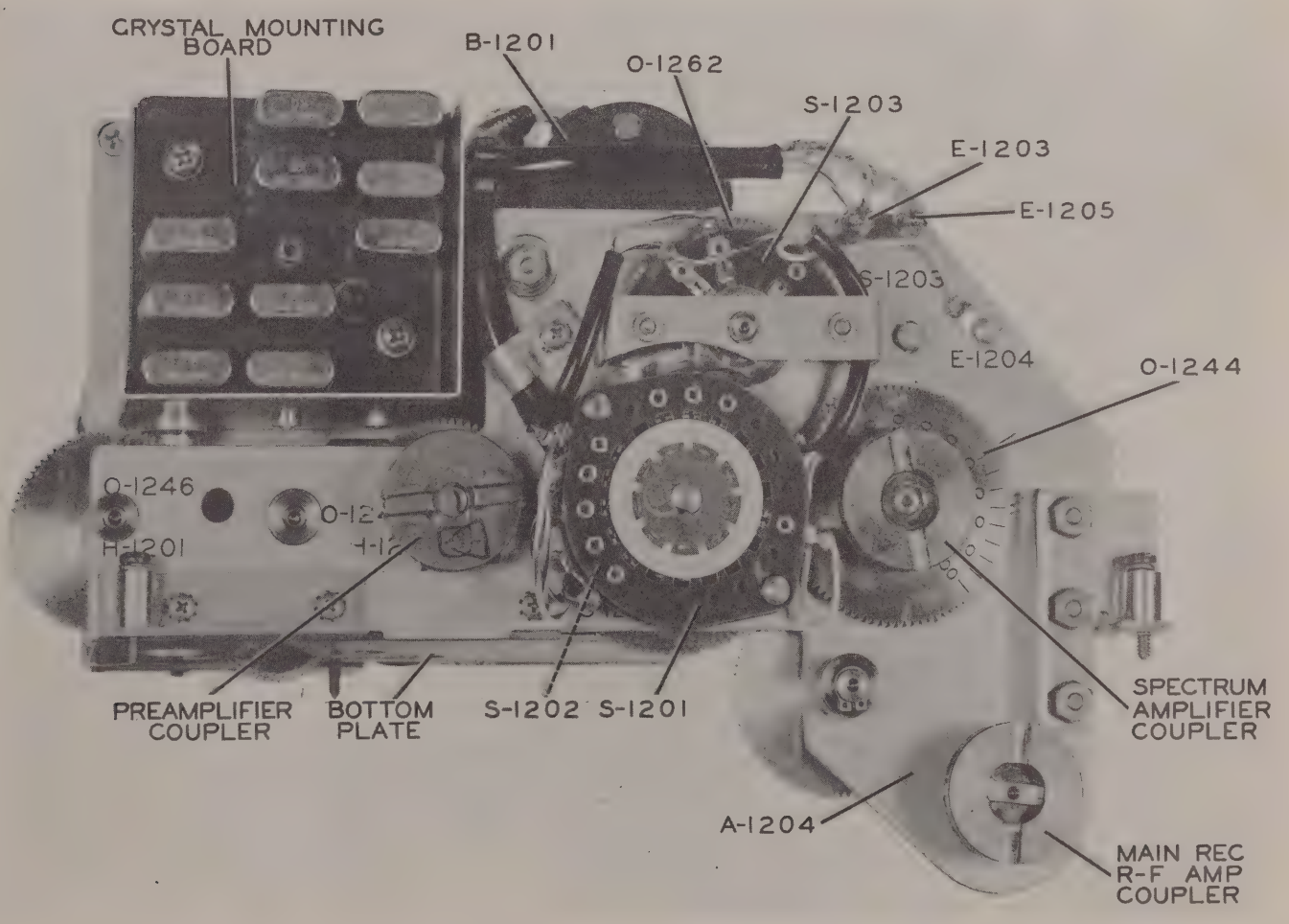


Figure 3-2. Mechanical Drive Subassembly, Right Side View

clapper of relay to be adjusted and rotating motor gear train by hand.

b. Release clapper. Relay contacts should be adjusted so they just barely make contact under this condition. Contacts can be adjusted by bending the stationary contact arm.

c. Relay contact pressure is obtained by an additional 1/64-inch of travel when the relay is actuated electrically.

3-13. CLUTCH MAINTENANCE.

a. To gain access to the clutch, remove the Truarc retaining ring using Truarc pliers and slide the gear off the shaft.

b. To remove the clutch from the drum, press the ends of the clutch toward each other, using wire bending pliers, and slide the clutch out of the drum.

c. To remove the clutch drum from the shaft, remove the Truarc ring with Truarc pliers and while holding the shaft, (do not use pawl to hold shaft) loosen the nut with pliers or wrench and proceed to slip the spacer and drum from the shaft.

d. Before replacing the clutch ring in the drum, carefully wipe the inside of the drum to remove oil and grease and inspect the drum surface for scoring.

e. Lubricate the oilite bearing in the mounting plate with a drop of MIL-L-7870 oil.

f. The number of metal springs within the clutch shoe and the resilience of the metal springs determines the torque of the clutch.

g. Test clutch torque at 30 rpm after running-in clutch at least 100 revolutions at this speed. If necessary, change or adjust clutch springs to bring torque within range of 4-1/2 to 5-3/4 inch-pounds, when measured in a clockwise direction of rotation only (as viewed from relay side of Autopositioner plate).

NOTE

When repairing the clutch assembly associated with relay K-1202, the cam must be removed. No marking is necessary since phasing instructions in paragraph 3-16 will automatically reset cam to the proper position.

h. Use a new Truarc retaining ring when reassembly is complete.

3-14. INSIDE SWITCH PLATE (A-1204) REMOVAL AND REPLACEMENT.

a. Lay the Mechanical Drive Subassembly on the relays with the crystal cover up (see figure 3-2).

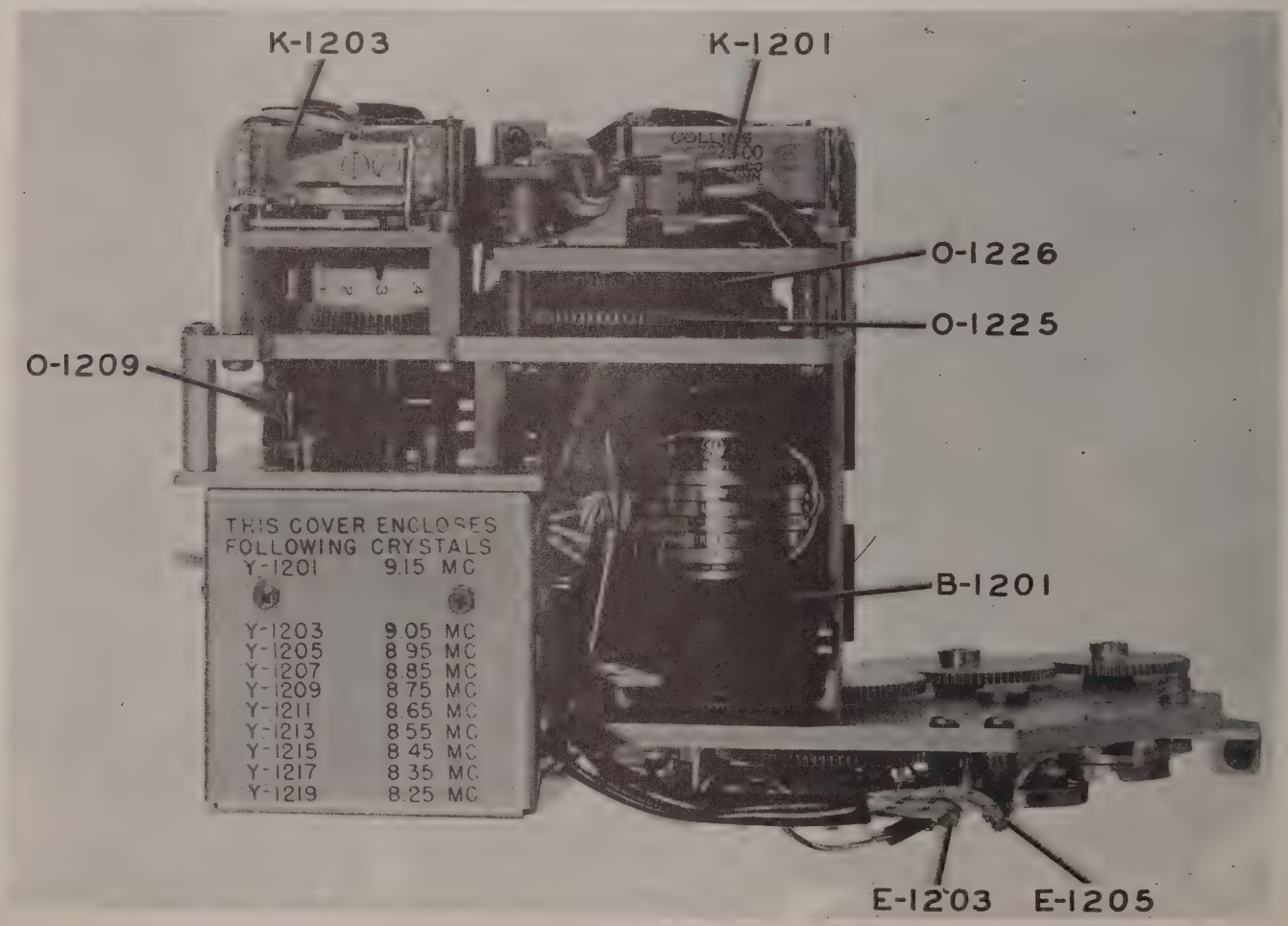


Figure 3-3. Mechanical Drive Subassembly, Top View

b. Remove switches S-1201 and S-1202 by removing the two mounting screws and sliding the switches from the shaft. Do not remove the wiring unless a switch is to be replaced.

c. Remove switch S-1203 by removing the two screws holding the mounting bracket to the plate. Remove the cable clamp and fold back the cable and switches out of the way.

NOTE

Be sure to retain the insulated spacers between switches S-1201 and S-1202 for use in reassembly.

d. Lift off the drive gear (O-1262) for switch S-1203.

e. Remove the two recessed motor mount nuts.

f. Remove the three screws and angle bracket securing the inside switch plate to the bottom plate.

g. Loosen the clamp on the preamplifier coupler and remove the coupler.

h. Remove the Truarc retaining ring on the spectrum drive coupler and lift the gear and attached coupler from the shaft.

i. Lift plate A-1204 straight up and off.

j. All shafts, except the differential coupler, can now be removed from opposite bearings for service or replacement. The motor bottom plate can be slid from its two holding bolts.

k. The plate (A-1204) is replaced by reversing the above procedure. It is not necessary to attempt exact synchronization of the switches during reassembly, refer to paragraph 3-16.

3-15. DIFFERENTIAL COUPLER REMOVAL AND REPLACEMENT.

a. Perform steps a through i of paragraph 3-14.

b. Remove the crystal cover from the tenth-megacycle crystals.

c. Remove the crystal mounting board and its associated selector switch (S-1205) by removing the two screws in the crystal mounting board.

d. Remove the crystal cover back plate by removing the four screws securing it to the side panel. Refer to figure 3-4.

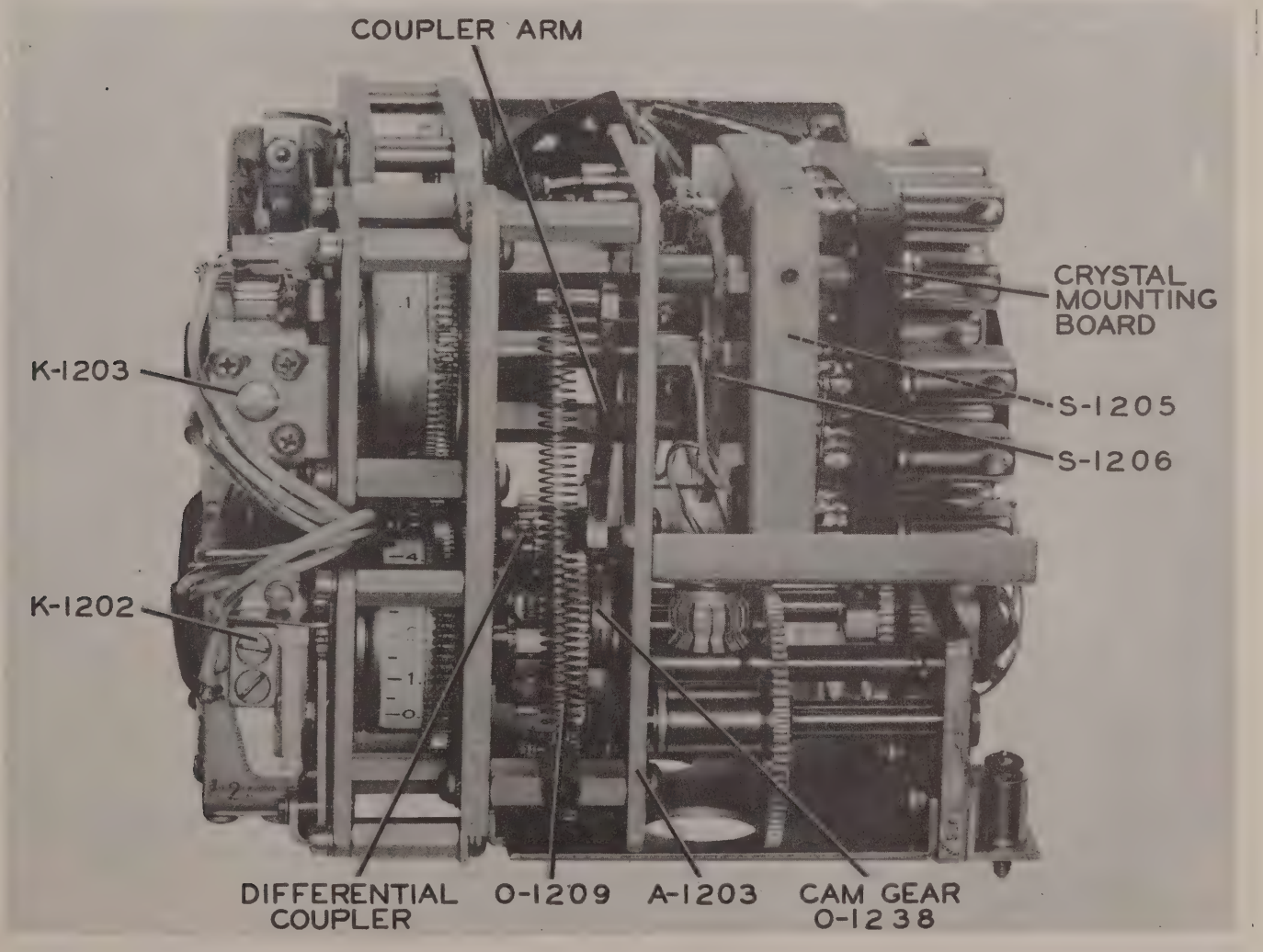


Figure 3-4. Mechanical Drive Subassembly, Front View

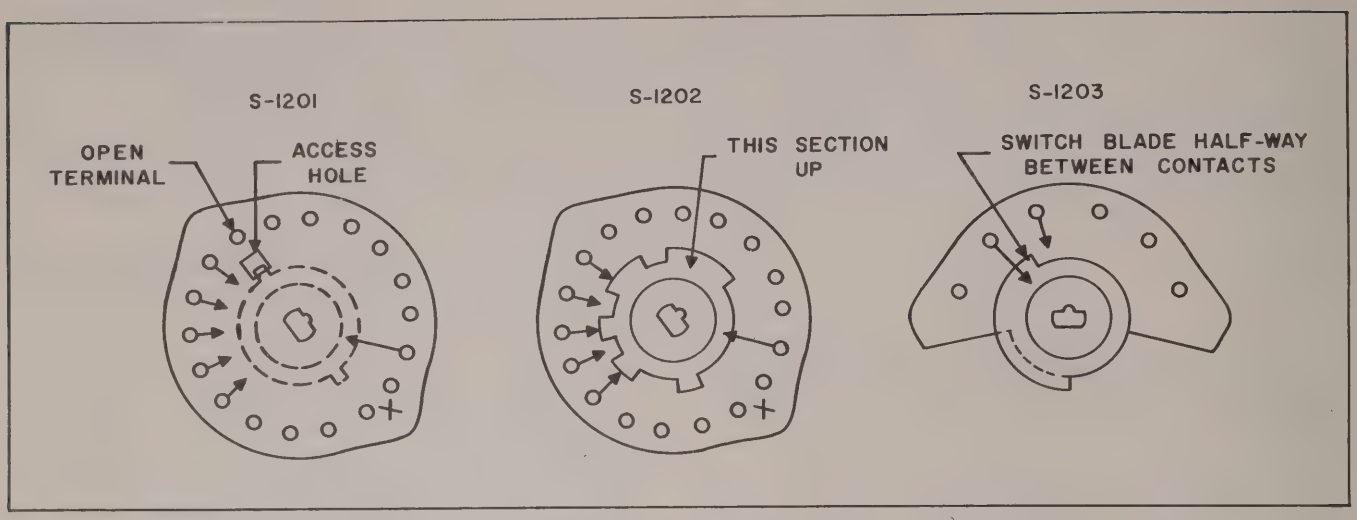


Figure 3-5. Mechanical Drive Subassembly Switches S-1201, S-1202, and S-1203, Phasing Position

e. Remove the two hexagonal standoffs from switch S-1206. Remove switch S-1206.
f. Remove the four mounting screws which secure the crystal cover side plate and remove the plate.
g. Remove the four mounting screws which hold plate A-1203 to the subassembly.
h. Lift plate A-1203 off and remove the differential coupler and arm.
i. When replacing crystal and seeking switches check for good alignment to conserve torque.
j. The differential coupler is replaced by reversing the above procedure.

3-16. PHASING THE AUTOPOSITIONERS OF THE MECHANICAL DRIVE SUBASSEMBLY. The mechanical drive is normally set to 200.0 megacycles for easy removal (all coupler lugs vertical). When a new or repaired mechanical drive is installed, it should be set to a corresponding 200.0 megacycles. The following procedure is designed to set all gears, couplers, and switches to this reference frequency regardless of how the switches and couplers have been turned during disassembly and assembly procedures.

3-17. PHASING OF THE SPECTRUM DRIVE SECTION.
a. Loosen the gear clamp on the rear of the shaft driving switches S-1201 and S-1202.
b. Rotate the spectrum amplifier coupler by hand, observing switch S-1201 (spectrum relay switch). At the end of the switch wafer, opposite the X mark on the wafer, an open terminal will be noticed (no rivet has been placed in the hole). This open terminal refers to a condition of no spectrum relays energized.
c. Refer to figure 3-5. Observe switch S-1201 and turn coupler until a narrow tab is seen through the previously mentioned open terminal (look through the opening below the rivetless terminal hole where a switch contact would normally be). There are two tabs on the switch exactly 180 degrees apart. The procedures of step d must be observed to determine that the switch is not 180 degrees out of synchronization.
d. Observe switch S-1202 (rear switch). The longest tab should be located in the upper right position. If this condition does not exist, the opposite tab should be selected in step c above, which should put both switches, S-1201 and S-1202, in their proper position, see figure 3-5.
e. Tighten the clamp loosened in step a to secure the switch positions.
f. Observe switch S-1203, the tab on the visable switch section should be halfway between center and left switch contacts as illustrated in figure 3-5. If this condition does not exist switch S-1203 and gear O-1262 must be removed and set to the proper position. The procedure is outlined in step g below. If switch S-1203 is found to be according to figure 3-5, proceed to step h.
g. Remove the two screws holding switches S-1201 and S-1202 to the hexagonal standoffs. Slide the two switches up the shaft, taking care not to disturb the settings of steps b, c, and d. Remove the two screws in the mounting bracket of switch S-1203 and slide the switch and gear O-1262 up the shaft until it can be positioned manually. Replace the two switch assemblies, making sure that synchronization is not lost when the gears mesh. Install mounting screws.
h. For a frequency of 200.0 megacycles, all coupler lugs should be vertical. If the spectrum coupler and preamplifier coupler are not vertical, loosen the clamps and position them vertically using a try square for accurate alignment. If gear O-1244 (figure 3-2) is stenciled in 10-megacycle increments, it should be set to 200 by removing the coupler, lifting the gear to release the mesh with O-1262, and repositioning the gear. Subassemblies on which there are no stencil markings gear O-1244 should not be concerned with positioning the gear, but need only place the coupler lugs vertically.
i. The Main Receiver R-F Amplifier Subassembly coupler should be set vertically by loosening the clamp on gear O-1212, located on the differential coupler shaft (nearest the back switch plate), rotating the main receiver coupler until the lugs are vertical (use a try-square or other 90 degree angle for accuracy) and retightening the clamp on O-1212.
j. Check the distance between the main switch plate (A-1204) and the top side of the large flat portion of the spectrum amplifier and preamplifier couplers.

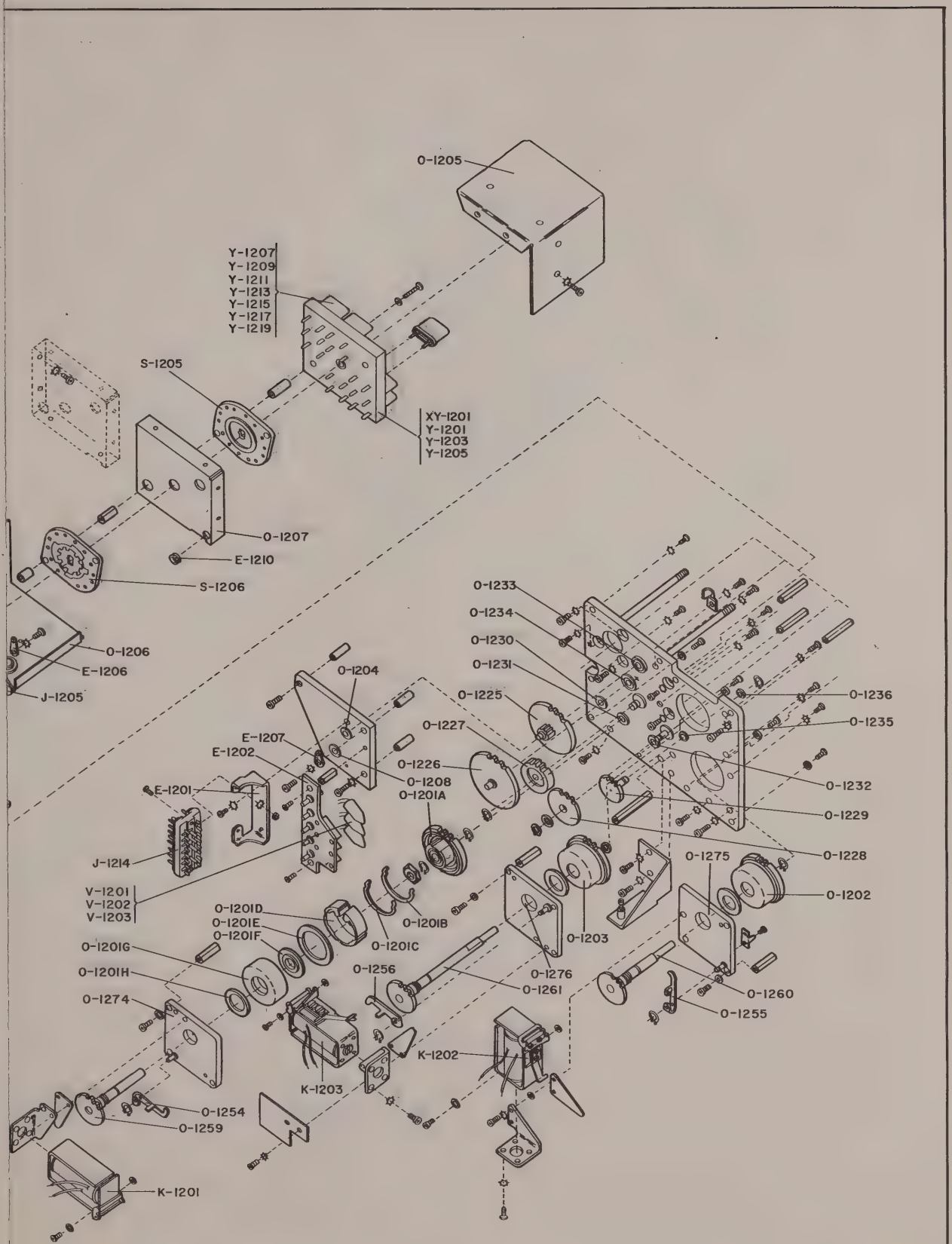


Figure 3-6. Mechanical Drive Subassembly, Exploded View

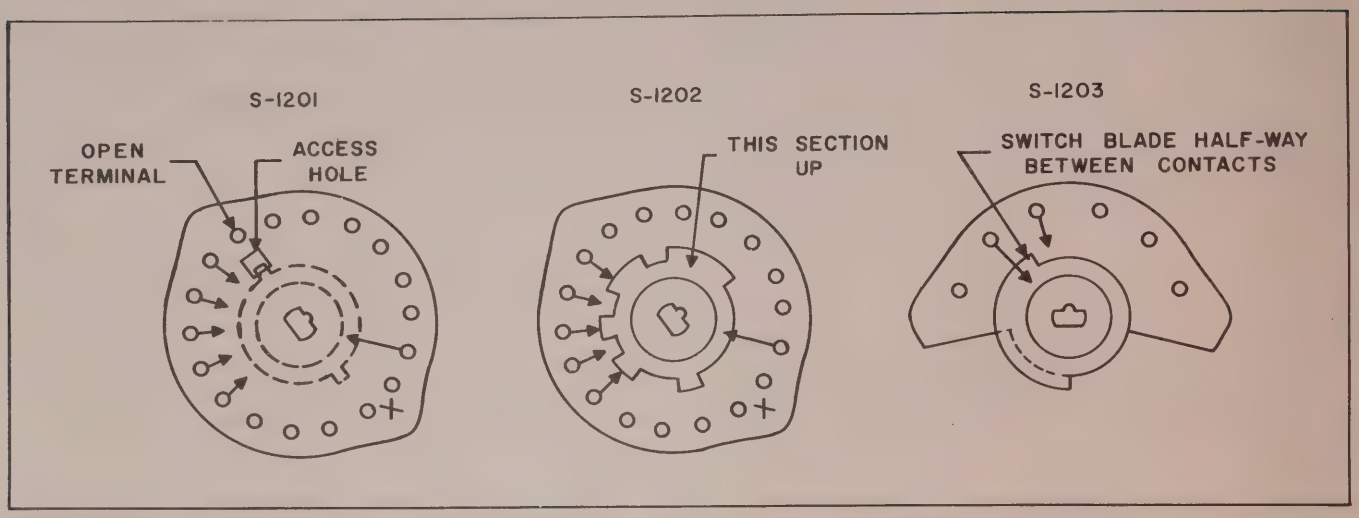


Figure 3-5. Mechanical Drive Subassembly Switches S-1201, S-1202, and S-1203, Phasing Position

e. Remove the two hexagonal standoffs from switch S-1206. Remove switch S-1206.
f. Remove the four mounting screws which secure the crystal cover side plate and remove the plate.
g. Remove the four mounting screws which hold plate A-1203 to the subassembly.
h. Lift plate A-1203 off and remove the differential coupler and arm.
i. When replacing crystal and seeking switches check for good alignment to conserve torque.
j. The differential coupler is replaced by reversing the above procedure.

3-16. PHASING THE AUTOPOSITIONERS OF THE MECHANICAL DRIVE SUBASSEMBLY. The mechanical drive is normally set to 200.0 megacycles for easy removal (all coupler lugs vertical). When a new or repaired mechanical drive is installed, it should be set to a corresponding 200.0 megacycles. The following procedure is designed to set all gears, couplers, and switches to this reference frequency regardless of how the switches and couplers have been turned during disassembly and assembly procedures.

3-17. PHASING OF THE SPECTRUM DRIVE SECTION.
a. Loosen the gear clamp on the rear of the shaft driving switches S-1201 and S-1202.
b. Rotate the spectrum amplifier coupler by hand, observing switch S-1201 (spectrum relay switch). At the end of the switch wafer, opposite the X mark on the wafer, an open terminal will be noticed (no rivet has been placed in the hole). This open terminal refers to a condition of no spectrum relays energized.
c. Refer to figure 3-5. Observe switch S-1201 and turn coupler until a narrow tab is seen through the previously mentioned open terminal (look through the opening below the rivetless terminal hole where a switch contact would normally be). There are two tabs on the switch exactly 180 degrees apart. The procedures of step d must be observed to determine that the switch is not 180 degrees out of synchronization.
d. Observe switch S-1202 (rear switch). The longest tab should be located in the upper right position. If this condition does not exist, the opposite tab should be selected in step c above, which should put both switches, S-1201 and S-1202, in their proper position, see figure 3-5.
e. Tighten the clamp loosened in step a to secure the switch positions.
f. Observe switch S-1203, the tab on the visable switch section should be halfway between center and left switch contacts as illustrated in figure 3-5. If this condition does not exist switch S-1203 and gear O-1262 must be removed and set to the proper position. The procedure is outlined in step g below. If switch S-1203 is found to be according to figure 3-5, proceed to step h.
g. Remove the two screws holding switches S-1201 and S-1202 to the hexagonal standoffs. Slide the two switches up the shaft, taking care not to disturb the settings of steps b, c, and d. Remove the two screws in the mounting bracket of switch S-1203 and slide the switch and gear O-1262 up the shaft until it can be positioned manually. Replace the two switch assemblies, making sure that synchronization is not lost when the gears mesh. Install mounting screws.
h. For a frequency of 200.0 megacycles, all coupler lugs should be vertical. If the spectrum coupler and preamplifier coupler are not vertical, loosen the clamps and position them vertically using a try square for accurate alignment. If gear O-1244 (figure 3-2) is stenciled in 10-megacycle increments, it should be set to 200 by removing the coupler, lifting the gear to release the mesh with O-1262, and repositioning the gear. Subassemblies on which there are no stencil markings gear O-1244 should not be concerned with positioning the gear, but need only place the coupler lugs vertically.
i. The Main Receiver R-F Amplifier Subassembly coupler should be set vertically by loosening the clamp on gear O-1212, located on the differential coupler shaft (nearest the back switch plate), rotating the main receiver coupler until the lugs are vertical (use a try-square or other 90 degree angle for accuracy) and re-tightening the clamp on O-1212.
j. Check the distance between the main switch plate (A-1204) and the top side of the large flat portion of the spectrum amplifier and preamplifier couplers.

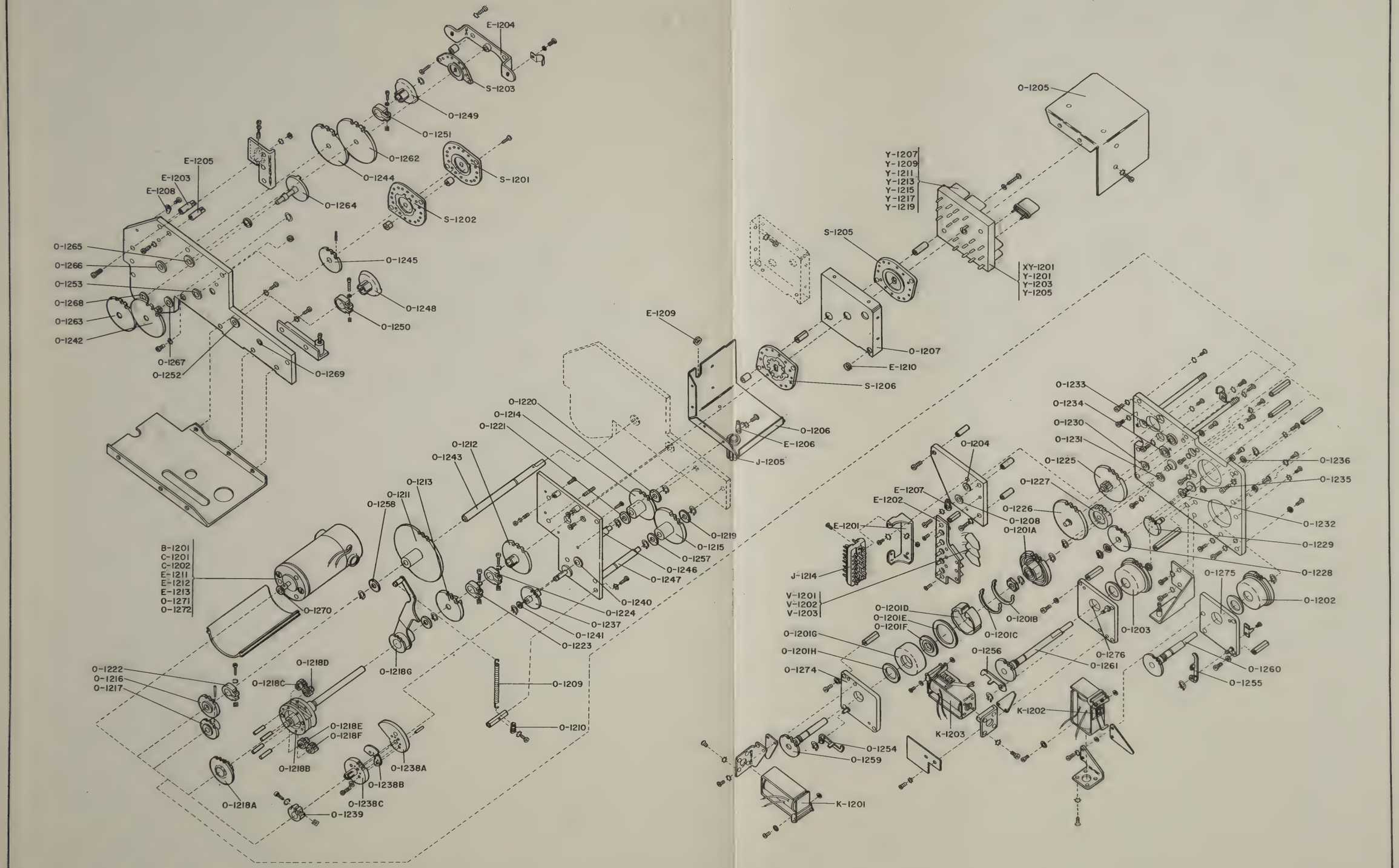


Figure 3-6. Mechanical Drive Subassembly, Exploded View

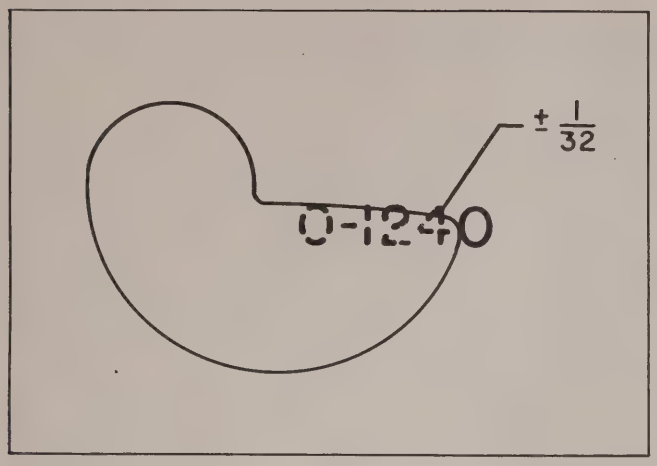


Figure 3-8. Mechanical Drive Subassembly Cam Gear Setting

For proper operation the distance should be 0.479 inch (±0.005 inch). If this condition does not exist, loosen coupler and move in or out on shaft.

3-18. PHASING OF 20-30 MEGACYCLE I-F SECTION.

a. Locate the cam on the shaft of the relay-clutch assembly K-1202. If the clutch drum of K-1202 is marked in 1.0 megacycle steps, depress the relay clapper and rotate the motor gear train by hand until the pointer indicates 0. megacycles. If the clutch drum is not marked, this step is omitted.

b. Loosen the clamp holding the gear and cam to the shaft.

c. Rotate the cam until it is nearly horizontal and the flat return section is up.

d. Observe the screened number O-1240, located adjacent to the cam on the center plate of the Mechanical Drive Subassembly. Set the cam so that the flat portion is even with the tip of the 4 in the number O-1240, refer to figure 3-8.

e. Tighten gear clamp loosened in step b.

3-19. PHASING OF THE TENTH MEGACYCLE CRYSTAL SELECTOR.

a. Relay K-1203, and its associated Autopositioner, selects the proper tenth megacycle crystal from a bank of ten by positioning switches S-1205 and S-1206.

b. If the clutch drum of K-1203 is marked in 0.1 megacycle steps, depress the relay clapper and rotate the motor gear train by hand until the pointer indicates .0 megacycles. If the clutch assembly has been removed, and the switch has not been altered, the flat of the clutch assembly shaft should be turned to line up with the flat of the wafer switches. This should set the mechanism at 200.0 megacycles. If the switches have been removed or replaced, but the shaft unaltered, then the switches should be turned to match the flat of the shaft. The shaft or the switches must serve as the 200.0-megacycle reference.

3-20. LUBRICATION. When a Mechanical Drive Subassembly has been reassembled all gears should receive a light coating of MIL-G-7421 grease. Particular attention should be given to gears cleaned in carbon tetrachloride, or other dry cleaning solvent, to make certain that the teeth are well lubricated before operation. Use a small amount of MIL-G-7421 grease on the differential coupler and the face of the 20-30 megacycle i-f cam. Use MIL-L-7870 oil on all bearings, sleeve joints, and pivotal points.

3-21. RADIO SET CONTROL C-626/ARC-27.

3-22. In order to facilitate replacement of any part contained in Radio Set Control C-626/ARC-27, a complete disassembly procedure is outlined below. Reference should be made to figure 3-7, exploded view, and illustrations listed in the procedure. Extreme caution must be used when disassembling the control unit to prevent loss of small parts, washers, and gears. Always provide several containers to hold minute parts, screws, washers, and hex nuts before starting the disassembly procedures.

NOTE

Considerable time should be spent in trouble shooting and adjustment procedures before attempting to disassemble a component to correct a malfunction. In most cases trouble can be corrected by adjustment procedures and intelligent application of operational theory. If trouble is known to exist in a detail part, or a small assembly of parts, which is not readily accessible, the following disassembly and reassembly instructions are supplied as a step-by-step guide to completely dismantle Radio Set Control C-626/ARC-27. These instructions are not to infer that a unit should be regularly disassembled, since the operation will disturb factory aligned adjustments and reassembly procedures must be strictly observed.

3-23. DISASSEMBLY.

a. Remove the four screws (two #6 and two #10) from the back of the case. These four screws have been secured in place at the factory by the application of a blue glyptal solution. Heating the heads of the screws with a soldering iron will sometimes allow them to be removed more easily. Remove the cover.

b. Remove the three frequency selector wing nuts and the three frequency selector knobs, designated MEGACYCLES, from the front panel of the control unit.

c. Remove the two #10 screws from the top front covers of the unit.

d. Remove the two #6 screws from the bottom plate of the unit which go into the two metal blocks of the rear switch plate.

e. Lift off the front panel assembly. The control unit will split into two parts, the front panel assembly and the Autotune assembly, joined by the interconnecting cable.

f. At this point in the disassembly procedure the rear terminals of receptacles J-1601, J-1602, and J-1603 are accessible. Switches S-1611, S-1610, and S-1602 are also accessible for service or replacement.

g. Remove the LOCAL CHANNEL SELECTOR, LOCAL-REMOTE, and GUARD-BOTH-COMD T/R control knobs.

h. Remove the four #6 screws in the front panel which hold the switch mounting plate to the back of the front

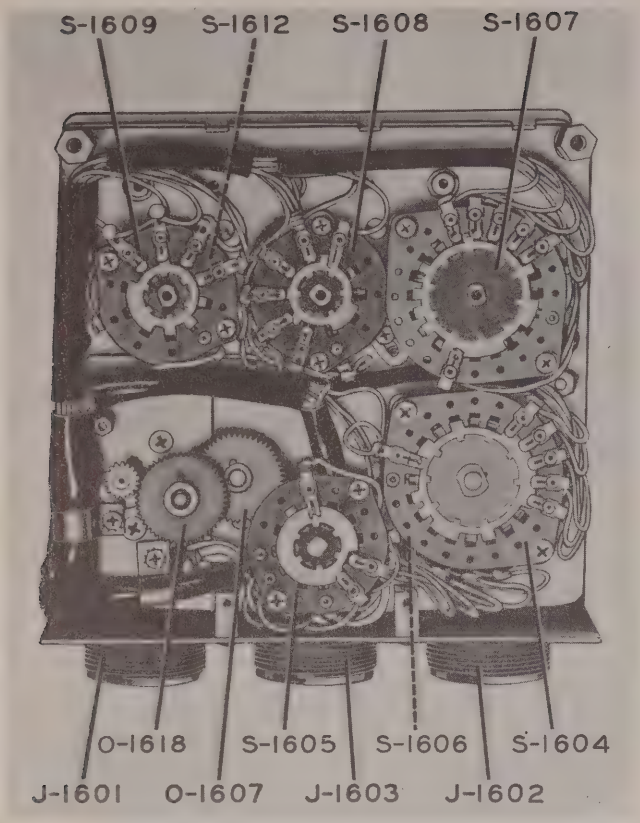


Figure 3-9. Radio Set Control C-626/ARC-27, Rear View

panel assembly. The plate may be removed to gain access to the rear of the LOCAL-REMOTE and GUARD-BOTH-COMD T/R switches for maintenance or replace - ment.

i. With Radio Set Control C-626/ARC-27 divided into two assemblies, as outlined above, relays K-1601and K-1602 are accessible for maintenance on the Autotune assembly. Seeking switches S-1604, S-1605, and S-1606, and selector switches S-1607, S-1608, S-1609, and S-1612 are accessible on the back plate of the same assembly. See figure 3-9.

j. Remove motor B-1601 by removing the three #6 flathead screws which secure the front of the motor to the assembly back plate.

k. To remove the Autopositioner mounting plate, including relays K-1601 and K-1602, gear O-1686 must be removed. Removal of the gear is accomplished by removing the Truarc retaining ring under switch S-1605 (on the gear side of the back plate). Remove the two screws and two nuts from the Autopositioner mounting plate (front side), and lift the entire assembly straight up and off the mounting posts.

l. Gears O-1603, O-1682, and O-1687 are now accessible on the control unit backplate.

m. The phenolic gear O-1618 is removed, if required, by removing the C-washer and sliding the gear from the shaft.

n. Phenolic gear O-1607 is removed by knocking out the taper pin (large end first) and sliding the gear from the shaft. At this point the pinion shaft O-1684 is removable.

o. To remove gears (O-1689 and O-1683) from Autopositioner shafts, knock out taper pins from gears and remove. Gear O-1601A and O-1602 can be removed. The inside of the clutch assemblies can be removed by

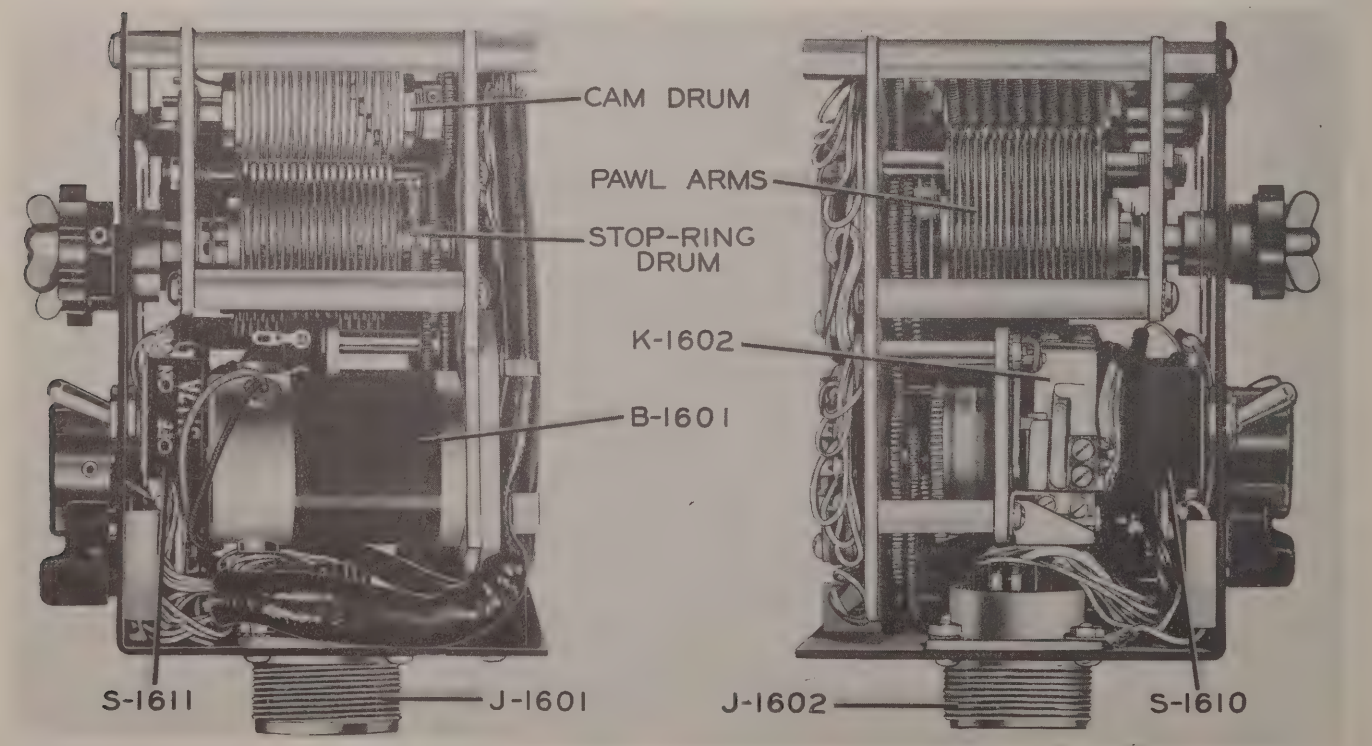


Figure 3-10. Radio Set Control C-626/ARC-27, Left and Right Side Views

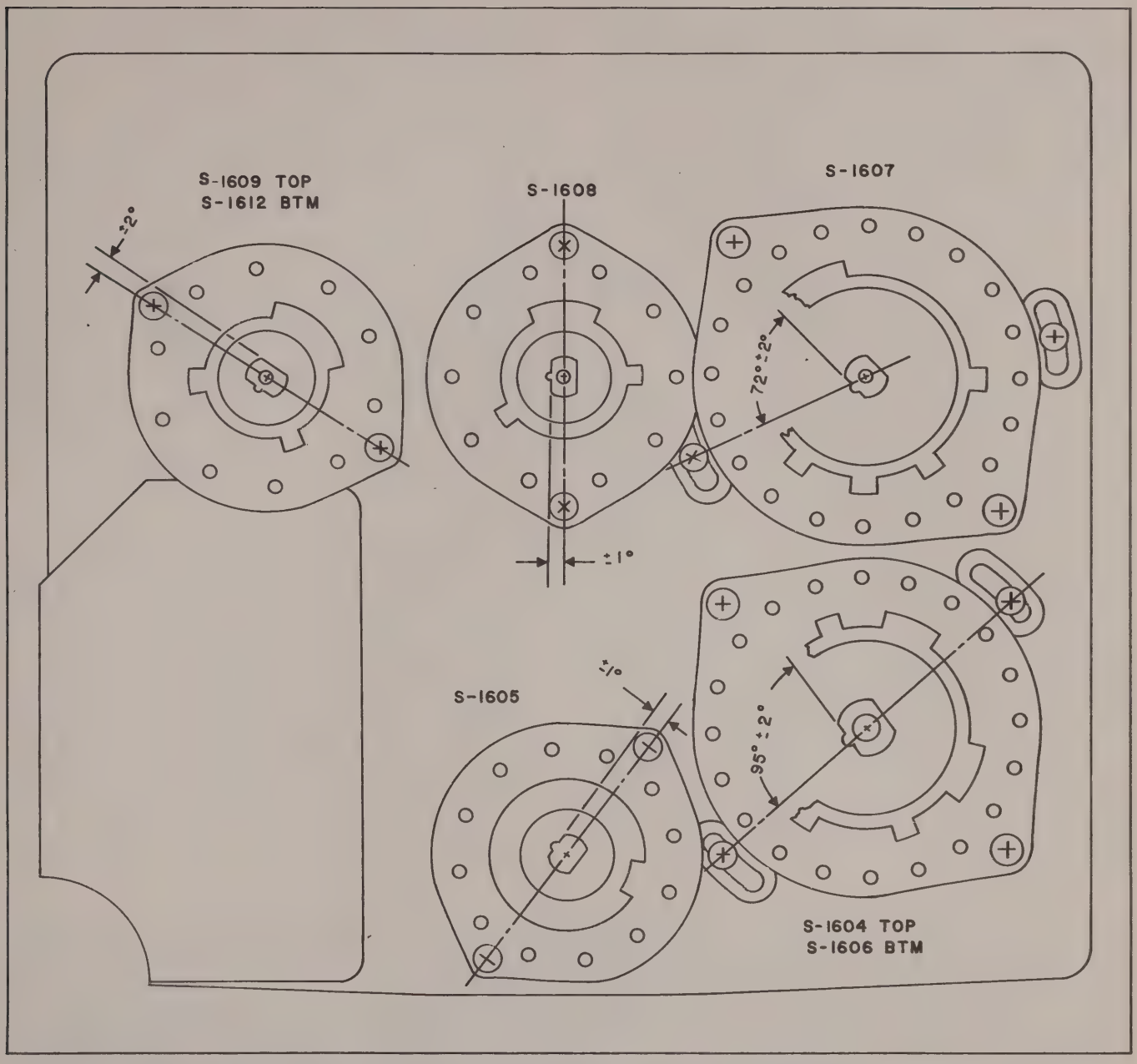


Figure 3-11. Radio Set Control C-626/ARC-27, Shaft Positioning For Reassembly

compressing the ears on the clutch bands, O-1601D and O-1602D, and pulling from the clutch drum.

NOTE

For clutch maintenance procedures refer to paragraph 3-13.

p. Autopositioner relays K-1601 and K-1602 are removed by removing the three #4 mounting screws and lifting the relay straight up. Autopositioner pawls (O-1642 and O-1643) can be removed by removing the C-washers.

q. Remove front plate dials I-1601, I-1602, I-1603, and I-1604 on the main Autotune assembly by loosening associated setscrews and slipping dials from shafts.

r. Remove two top hex metal standoffs and two #10 screws holding the front plate.

s. Remove glyptal covered 1/4" hex nuts on the end of each pawl shaft.

t. Remove front plate A-1604. The cam drums, the stop-ring assemblies, and the pawl assemblies will remain attached to the front plate.

u. At this point the cam drums can be removed.

v. Each stop-ring shaft and its associated pawl shaft must be removed at the same time. This is accomplished by unscrewing the pawl shaft from the front plate and sliding the stop-ring shaft out at the same time.

w. Gear O-1676 and the spacer on the other two stop-ring shafts can be removed by removing the Truarc retaining ring.

x. The detent arm gear assemblies on the rear of the stop-ring shafts can be removed by spreading the detent arms and sliding the gear off the shaft.

CAUTION

No attempt should be made to disassemble the stop-ring drums. This assembly should be replaced as a unit if necessary.

3-24. REASSEMBLY.

a. Reassembly procedures are essentially the reverse of the disassembly procedures described in paragraph 3-23. The following steps are precautions and suggestions which follow in a logical reassembly sequence.

b. When the stop-ring drums and cam drums are reassembled to the rear plate, position the flats of the stop-ring shafts as shown in figure 3-11 by adjusting the gear mesh.

c. The pawl shaft assembly must be adjusted so that the pawls are lined up with the grooves in the cam drum and the grooves in the stop-ring drum. This is accomplished by screw adjustment of the pawl shaft into the front plate. When the adjustment is complete, the jam-nut should be tightened on the shaft.

d. As gear O-1682 is assembled, its mesh must be adjusted to permit the flats in the switch rotor to align as shown in figure 3-11.

e. Reassemble Autopositioner mounting plate, replacing gear O-1686, and pinion shaft O-1684, at the same time. Several gears must mesh as this assembly goes together.

f. Loosen the setscrews on each of the three cam drum gears.

g. Rotate each cam drum, by means of a #10 Bristo wrench, until first (front) pawl drops into cam, rotate stop-ring shaft until the pawl drops into the stop-ring notch. Rotate the cam clockwise against the end of the pawl tip. Remove the backlash in the cam driving gear by rotating the last gear in the train clockwise as far as it will go. Hold the gear and advance the cams approximately 0.020-inch (measured circumferentially on the cam surface). Tighten the setscrews on each gear.

h. Replace Truarc ring under switch S-1605. Switch S-1605 must be positioned as shown in figure 3-11 and secured to the mounting posts. If the flats on the switch drive shaft do not line up with the flats in the switch rotor, the gear mesh on the switch drive shaft must be adjusted until the switch can be mounted without rotation. During this adjustment, the Autopositioner pawl must be in a notch.

i. Adjust the relay contacts of K-1601 and K-1602 in accordance with procedures in paragraph 3-12.

j. Replace motor and gearing.

k. Assemble indicator dials.

l. Rotate left-hand knob until S-1607 rotor is in the same position as shown in figure 3-11. Turn dial plate until the number 20 appears in the first two apertures in the front panel. Check for adequate clearance to channel indicator dial. Tighten dial setscrews and liquid stake with blue glyptal.

m. Rotate the middle knob until switch S-1608 corresponds to figure 3-11. Turn dial plate to 0 and tighten setscrews and liquid stake with blue glyptal.

n. Rotate right-hand knob until switch S-1609 corresponds to figure 3-11. Turn dial plate to 0 and tighten setscrews and liquid stake with blue glyptal.

o. Check operation on all channels to make certain that pawl drops and shafts lock properly. Check guard

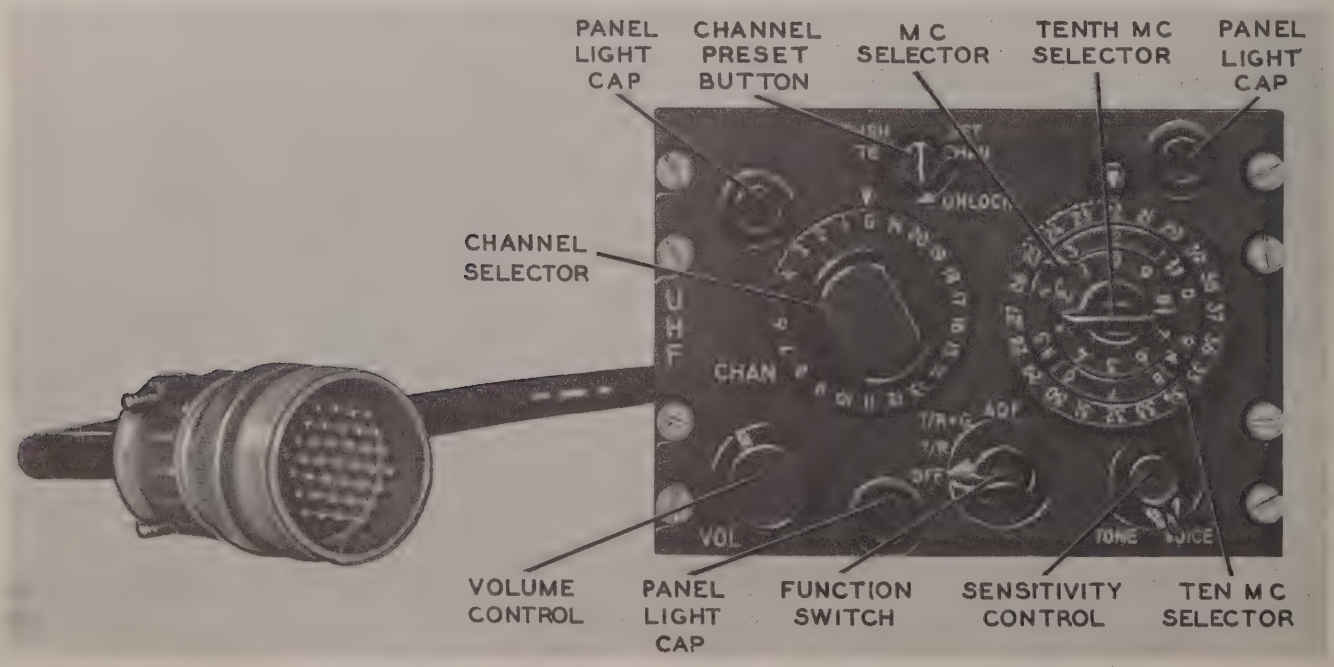


Figure 3-12. Radio Set Control C-1015/ARC-27A, Front View

channel to see that all pawls drop and shafts lock properly. Check manual channel to see that all pawls are lifted.

3-25. RADIO SET CONTROL C-1015/ARC-27A.

3-26. ADJUSTMENT. Adjustments should not be made in Radio Set Control C-1015/ARC-27A unless it has definitely been established that malfunctioning exists within the unit. The most positive check is to replace the C-1015/ARC-27A with one known to be in good operating condition and observe the function of the AN/ARC-27A equipment. If the trouble is corrected, it may be assumed that the original trouble exists in the functioning components of the C-1015/ARC-27A. Two adjustments, outlined below, may be performed by depot service technicians that will, in most cases, eliminate trouble within the unit. Refer to figure 3-13 for identification of detail parts referred to in this procedure.

NOTE

The adjustment and repair instructions provided in this handbook apply to Radio Set Control C-1015/ARC-27A marked MOD 1. This modification was incorporated into the equipment starting with Serial Number 1000 on contract NOas 52-349. The modification provided for the addition of the cam springs and changes in the pawl brackets to increase movement and provide a more positive action of the pawl bracket. When adjusting Radio Set Controls C-1015/ARC-27A which do not incorporate MOD 1, the pawl adjustment must be made by bending the pawl bracket tabs where reference is made to bending cam spring.

3-27. PAWL ADJUSTMENT. If trouble exists within the control unit, indicated by continuous cycling of the Autopositioner or improper frequency selection, remove the dust cover and top triangular brace from the control unit. It is necessary to replace three screws in the side panel to secure the cam and pawl springs after removing the triangular brace. The pawl adjustment should be made first, to make sure that all pins in the channel selector drum segment are operating properly. Refer to figure 3-16: If a pin in the drum segment does not lock "up" or "down", indicated by the collar of a pin preventing the locking bar from fully returning to position, bend the end of the cam spring, riding on the cam, very slightly to obtain proper action. When the cam spring raises its end of the pawl bracket, the pawl bracket must depress the pin sufficiently so that the collar of the pin does not prevent the locking bar from returning to position. When the cam spring lowers its end of the pawl bracket, the collar of the pin must be above the locking bar and allow the locking bar to return to position. It is often difficult to locate which pawl bracket is not operating its pin properly; therefore, turn the selector drum 180° and work from the bottom of the control unit. It can immediately be seen which pin is caught in the locking bar. Note the pin number which is at fault and rotate the drum 180° to the original position and make adjustment to the cam spring

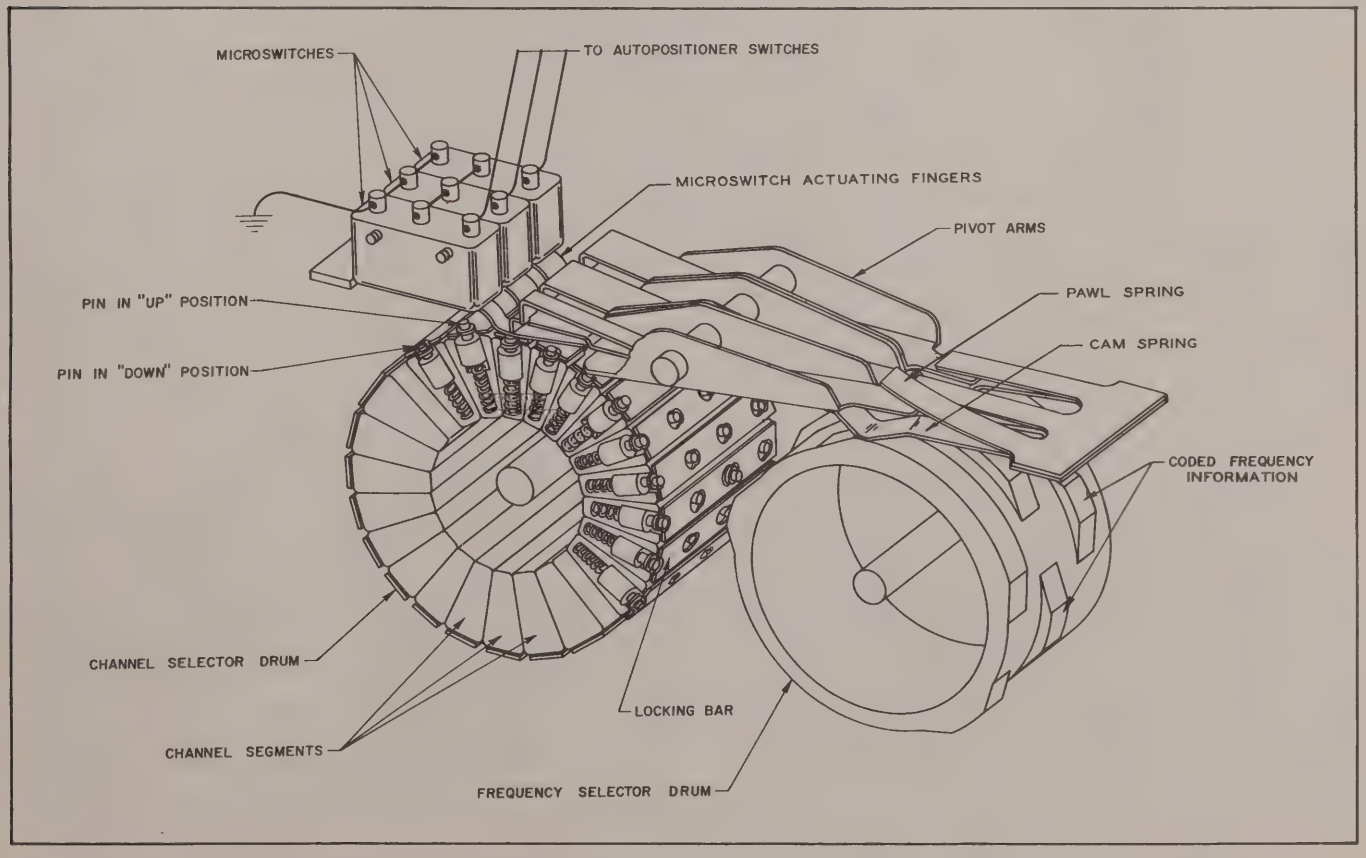


Figure 3-13. Radio Set Control C-1015/ARC-27A, Functional Diagram

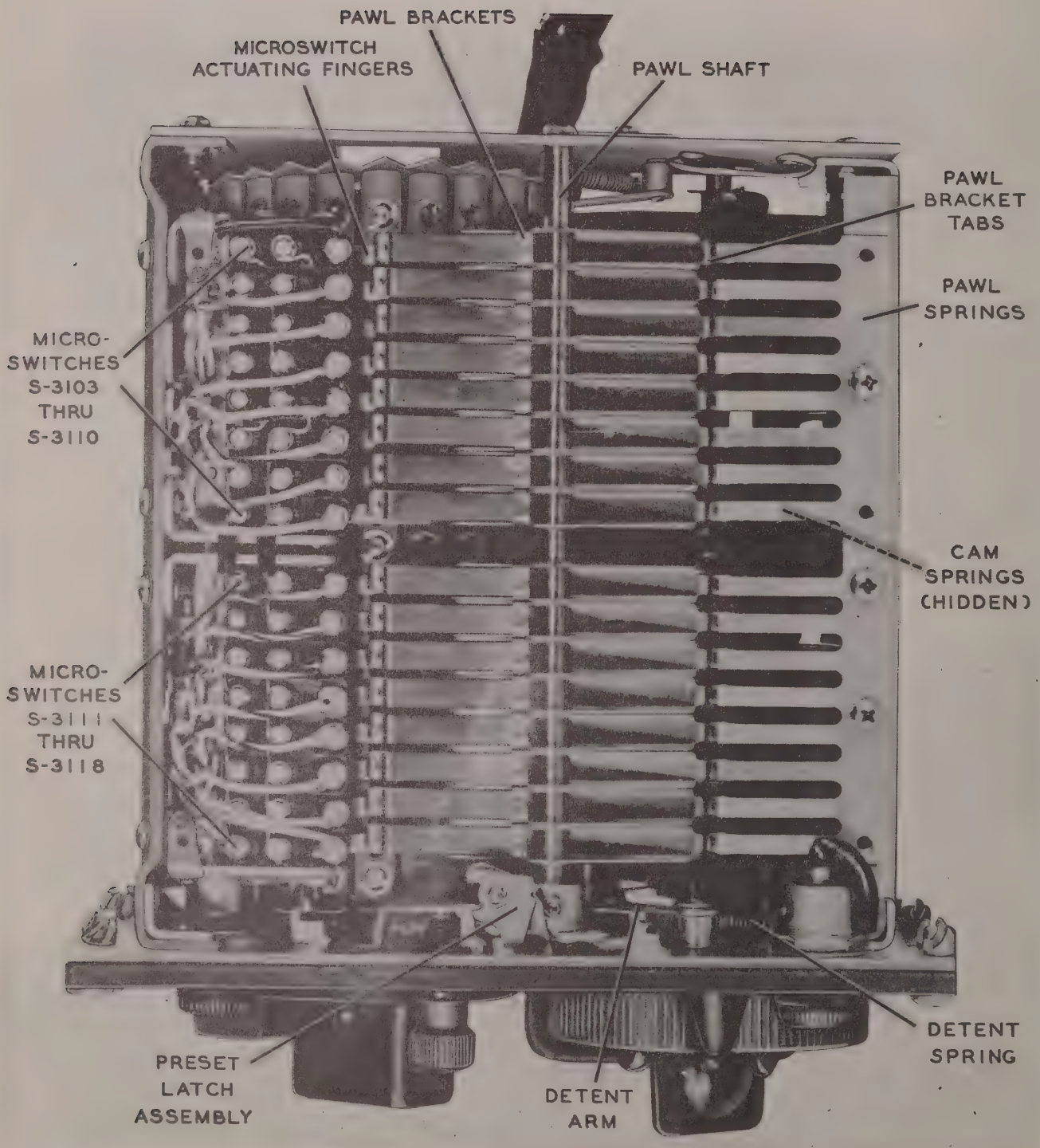


Figure 3-14. Radio Set Control C-1015/ARC-27A, Top View

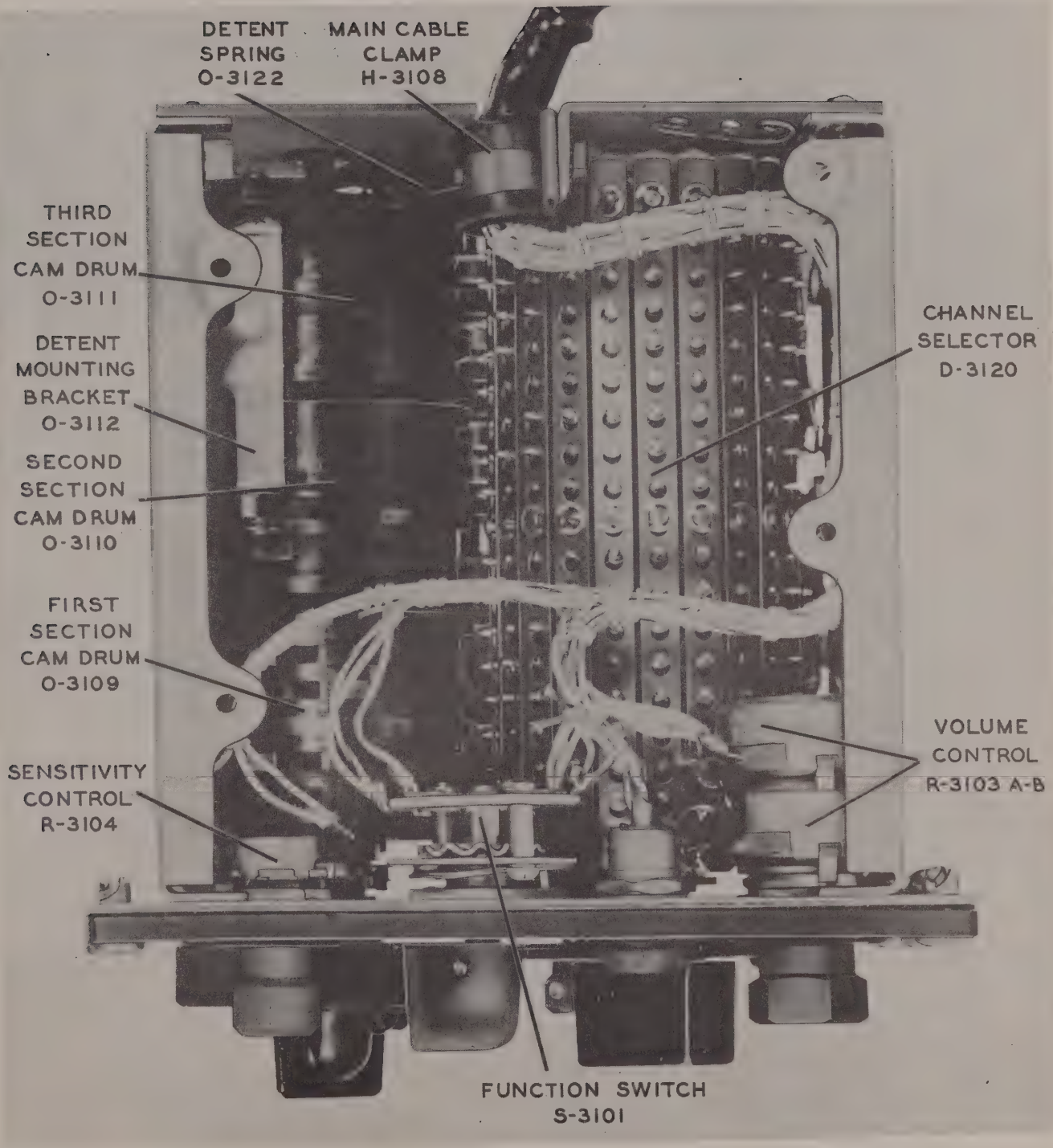


Figure 3-15. Radio Set Control C-1015/ARC-27A, Bottom View

associated with the faulty pin. The frequencies of 296.5, 278.4 and 321.0 are used to check the pin and cam spring adjustments.

3-28. MICROSWITCH ACTUATING FINGER ADJUSTMENT. If it is ascertained that the pawl and cam springs are operating normally, the microswitch actuator arms may be checked to determine whether or not the switch is actually operating. Refer to figure 3-14. Use a scribe or fine blade screwdriver to push down or pull up on the actuating fingers to insure correct switch operation. The switch actuating fingers may be bent slightly to accomplish a more positive action if the adjustment is deemed necessary. If the microswitch is found to be defective, the complete bank of eight switches must be replaced as a unit. No attempt should be made to replace a single switch within a bank, since the factory alignment of the complete group would be destroyed.

3-29. DISASSEMBLY AND REASSEMBLY INSTRUCTIONS FOR RADIO SET CONTROL C-1015/ARC-27A. In order to facilitate replacement of any part contained in the control unit, a complete disassembly procedure is outlined below. Reference should be made to figure 3-21, exploded view, for relative positioning of detail parts. Extreme caution must be used when disassembling the control unit to prevent loss of small parts and screws. Always provide several containers to hold minute parts, screws, washers, and hex nuts before starting the disassembly procedure.

3-30. If the trouble is found to exist in the volume control, sensitivity control, or function switch, the unit should not be disassembled to gain access to the faulty component. Remove the protective dust cover and inspect controls from the bottom of the unit, see figure 3-15. If replacement is necessary, remove all front panel control knobs and the panel light caps. Remove the plastic front panel held in position by the panel light caps. The control and switch mounting hardware is then accessible for removal. If it is necessary to remove a drum segment from the channel selector drum due to faulty operation of the pin, or pin spring, use the following procedure. Remove the strengthening brace across the bottom of the control unit. Rotate the channel selector knob until the drum segment to be removed is accessible from the bottom of the control unit, see figure 3-15. Insert a small bladed screwdriver between the segment to be removed and the adjacent segment. Push against the rear plate of the drum, turn the screwdriver into the segment, and lift

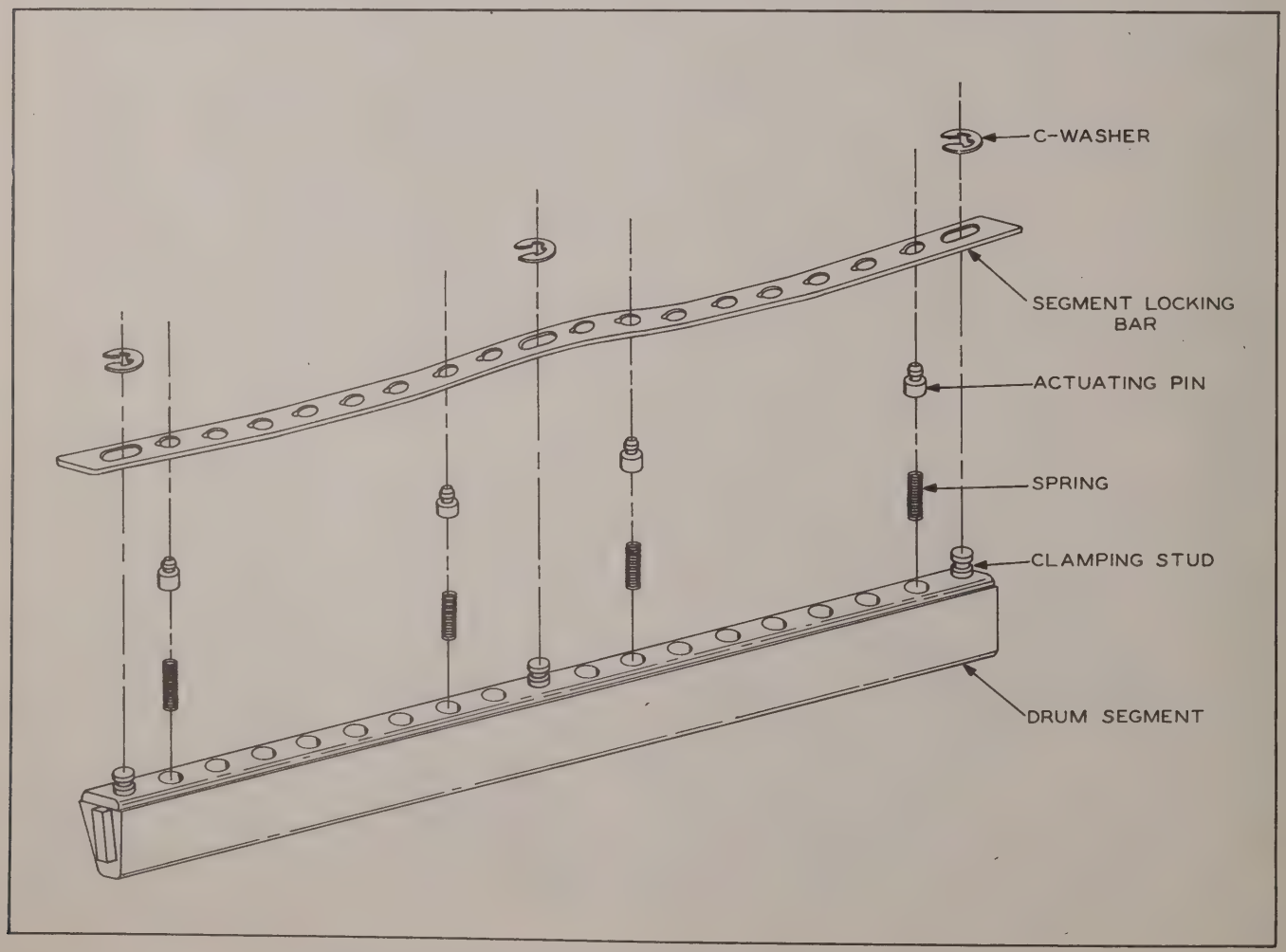


Figure 3-16. Drum Segment Construction, Exploded View

up. The segments are simply spring loaded and will disengage easily when the spring tension is released by pushing against the back plate of the drum assembly.

3-31. To disassemble an individual drum segment use the following procedure. Hold the locking bar, with the fingers spaced widely apart, tightly against the plastic drum segment. Remove the three C-washers that hold the locking bar in place on the plastic segment. Release the pressure slowly on the locking bar to prevent the spring loaded pins from flying out. The 16 pins and associated springs may be removed for service. When the drum segment is reassembled it will be noted that the segment locking bar is bowed slightly at two points. This construction is necessary to overcome the pin spring tension between the C-washers on the drum segment. The locking bar must be installed on the segment as indicated in figure 3-16. When the drum segment is reinserted into the channel selector drum, be sure the pin retaining shoulders of the locking bar point toward the rear of the control unit. Exert pressure on the rear plate of the drum and slide the segment into position. The segments on each side of the inserted segment should be checked to make sure they are properly seated in the retaining slots cut into the rear plate of the drum.

NOTE

Considerable time should be spent in trouble shooting and adjustment procedures before attempting to disassemble a control unit to correct a malfunction. In most cases trouble can be corrected by adjustment procedures and intelligent application of operational theory. If trouble is known to exist in a component which is not readily accessible, the following disassembly and reassembly instructions are supplied as a step-by-step guide to completely dismantle Radio Set Control C-1015/ARC-27A. These instructions are not to infer that a unit should be regularly disassembled, since the operation will disturb factory aligned adjustments and reassembly procedures must be strictly observed.

3-32. DISASSEMBLY.

a. Remove the control knobs and the panel light caps from the front panel of the control unit. Remove the plastic front panel.

b. Remove the protective dust cover by turning the two Dzus fasteners one-quarter turn counterclockwise and sliding off the dust cover.

c. Remove the triangular brace which crosses the top of the unit and the X-shaped strengthening brace across the bottom of the unit. Refer to figure 3-14 or figure 3-15 as an aid in performing the following steps.

d. Remove the three remaining screws which hold the pawl springs and the cam springs to the side panel. The two sets of bronze cam springs, though similar in appearance, are not interchangeable. Tag the springs as to "front" and "rear" springs before removing from the unit.

e. Remove the pawl shaft by removing the screws at the front and rear panels of the unit. The pawl shaft and pawl brackets are removed as a single unit. If a pawl bracket must be replaced, extreme care should be taken to retain the shims between each pawl bracket for use in reassembly.

f. Remove the detent springs holding the channel selector drum and frequency selector drum in place. Remove the detent bracket on the bottom right of the unit, used to further secure the frequency selector drum.

g. Remove the cable clamp mounted at the bottom rear of the control unit.

h. Remove the six screws holding the back plate of the unit to the side panels.

i. Remove the color coded cable wiring from the microswitches.

CAUTION

Use special care when unsoldering wires from the microswitch terminals to prevent the terminals from reaching a high temperature. Use a small pencil-tip soldering iron, approximately 37.5 watts, and work very quickly to remove the soldering iron in a minimum amount of time. Overheating the microswitch terminal will result in internal damage and render the switch useless.

j. If trouble is known to exist in the microswitches, or if the control unit is to be completely disassembled, the microswitch banks may be removed. Do not remove either of the microswitch banks unless it is absolutely necessary, since the removal will disturb factory aligned settings.

k. Remove the channel selector drum by sliding the assembly toward the rear of the unit.

l. Loosen the clamps on all three sections of the frequency selector cam drum. Hold the drum against the front panel and pull the inside shaft toward the rear as far as it will go. Grasp the rear section of the cam drum and, while exerting moderate pressure toward the inside, slide the drum and shaft past the rear side flange and out through the back of the control unit. The remaining two sections of the cam drum may be removed in a similar manner.

3-33. REASSEMBLY.

a. Insert the cam drum shaft with the largest diameter and smallest length inside the first section of the cam drum. Slide the shaft through the front panel so that about 1/4 inch of the flat side of the shaft is visible. Be sure the detent arm and roller rest on top of the drum, with the roller engaged in the notches of the drum.

b. Insert the shaft of the second section of the drum through the shaft of the first section and push forward until about 1/4 inch of the flat side of the shaft extends beyond the end of the first section shaft.

c. Insert the shaft of the third section, with cam drum attached, through the shaft of the second section and push forward until about 1/4 inch of the shaft extends beyond the end of the second section shaft. It may be necessary to exert moderate pressure on the side panel of the control unit to allow the third section of the cam drum to pass.

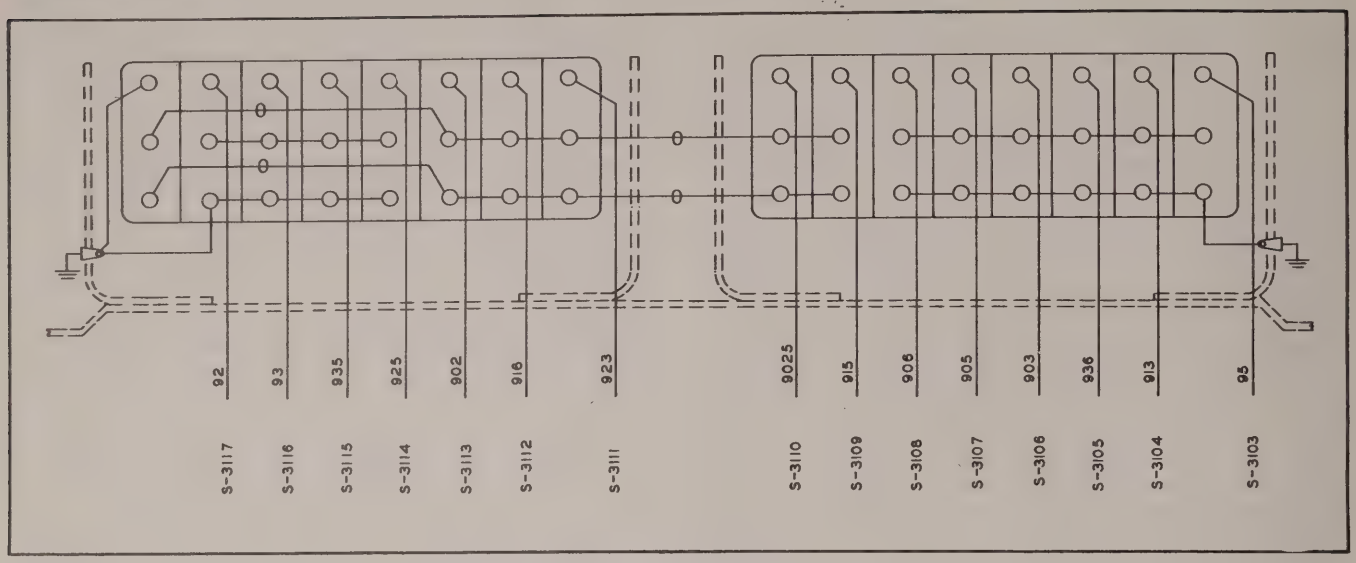


Figure 3-17. Microswitch Cable Connections

d. Insert the shaft of the channel selector drum through the bushing in the front panel and slide the drum fully forward.

e. Install the back plate of the control unit with six 4-40 x 1/4" Phillips head screws and six #4 external tooth washers. Be sure that the shafts of the channel selector drum and the frequency selector cam drum are properly installed in the bearings on the rear plate before tightening the mounting screws.

f. Attach the detent springs which hold the detent spring arms against the notched segments of the channel selector drum and the frequency selector cam drum, see figure 3-14.

g. Install the detent bracket, used to secure the frequency selector drums from the bottom side, in the proper position as shown in figure 3-15. Make certain the wheels of the detent bracket engage in the notched segments of the second and third sections of the cam drum. The bracket is installed with two 4-40 x 1/4" Phillips head screws, two #4 external tooth washers, and two 4-40 hex nuts.

h. Install the main cable mounting clamp to the mounting bracket at the bottom rear of the control unit. The clamp is mounted with one 6-32 x 5/16" Phillips head screw, one #6 external tooth washer, and one 6-32 hex nut.

i. The three sections of the frequency selector cam drum must be positioned as follows: The front panel frequency selector knobs may be temporarily installed in order to position the sections of the cam drum. Each section of the drum has a white identification dot inscribed on the outside front of the plastic body. These white identification dots must be lined up across the top of the control unit. This setting corresponds to a frequency of 200.0 on the frequency selector knobs. Since the sections of the drum are not clamped to their respective shafts, the frequency selector knobs may be positioned without affecting the position of the drums. When the frequency of 200.0, as indicated by the frequency selector knobs, lines up with the white identification dots on the sections of the cam drum, the individual drum section clamps may be tightened, securing the drum sections to their shafts. Make certain that all detent arms and rollers are engaged in the notched portions of the drum sections. There should be a slight amount of play in all sections when properly mounted and the shaft should not bind at either end. When the operations of this step are completed, remove the control knobs from the front panel.

CAUTION

Do not change the position of the frequency selector cam drums in any of the following procedures. When subsequent parts are installed, the white identification dots on the cam sections will not be visible.

j. If microswitches were removed as part of the disassembly procedures, they should be installed in the proper position as shown in figure 3-14. Each bank of microswitches is mounted to the side panel with four 4-40 x 1/4" Phillips head screws and four #4 flat washers.

k. To adjust the position of the microswitch banks, turn the channel selector drum to the manual position. Align the switch bank horizontally so that the pins of the drum segment center under the actuating fingers of the microswitches. Align the switch bank vertically so that the switches operate at the mid-point of the actuating finger travel. The adjustment is extremely critical and should be made with great care. The screws should be sealed with glyptal after proper adjustment is made.

l. Connect the color coded wiring to the terminals of the microswitches in accordance with figure 3-17.

CAUTION

Use special care when soldering wires to the microswitch terminals to prevent the terminal from reaching a high temperature. Use a

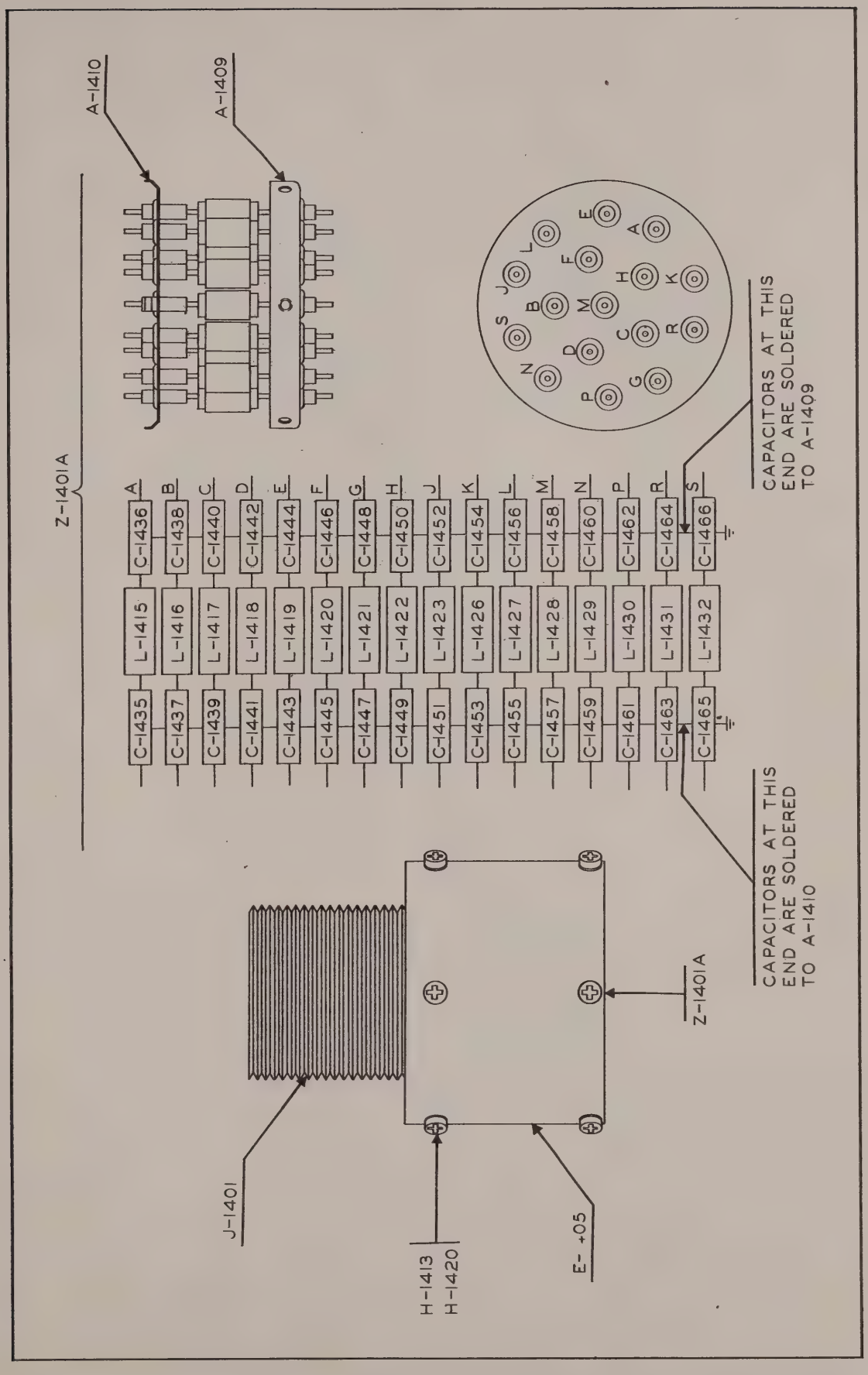


Figure 3-18. Receiver-Transmitter RT-178/ARC-27, Front Panel Receptacle J-1401

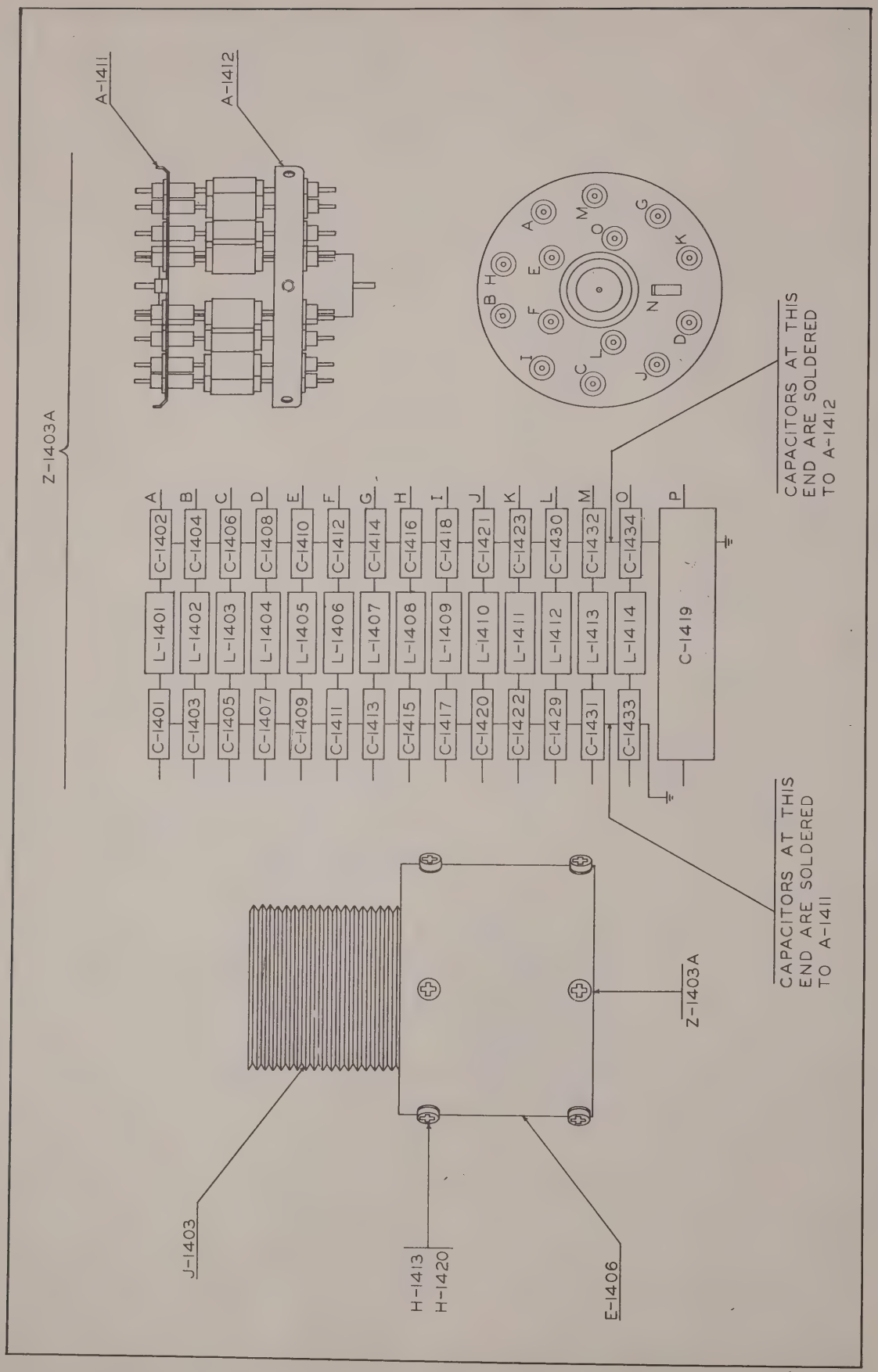


Figure 3-19 Receiver-Transmitter RT-178/ARC-27, Front Panel Receptacle J-1403

small pencil-tip soldering iron, approximately 37.5 watts, and work very quickly to remove soldering iron in a minimum amount of time. Overheating the microswitch terminal will result in internal damage and render the switch useless.

m. Install the pawl shaft, complete with all pawl brackets mounted, in the proper position as shown in figure 3-14. The shaft is held in place by 4-40 x 1/4" Phillips head screws and #4 external tooth washers which go through the front and back plate of the control unit. Do not tighten the mounting screws until the following adjustments are made.

n. Install the copper-colored cam springs in the position shown in figure 3-14. The cam springs ride on the frequency selector drum cams and are positioned beneath the pawl bracket tabs. The pawl springs are then mounted directly over the cam springs and are positioned on top of the pawl bracket tabs. The six 4-40 x 1/4" Phillips head screws and six #4 external tooth washers are installed through both the pawl springs and cam springs into the side of the control unit to hold the springs in place. Do not tighten the screws until the following adjustments are made.

o. Make certain the preset latch assembly, figure 3-14, is turned in a horizontal position, and that the spring loaded locking lever has the locking teeth toward the rear of the unit. Exert pressure downward on the pawl shaft as far as possible and tighten the end screws securely. Considerable pressure is required to seat the pawl shaft in the proper position, however, use extreme care to prevent bending the pawl brackets attached to the pawl shaft. The pawl operation should be checked as described in the adjustment procedures, paragraph 3-26.

p. Install the triangular brace across the top of the control unit. Three screws which hold the cam springs and pawl springs to the side panel must be removed and reinserted through the triangular top brace. Three additional 4-40 x 1/4" Phillips head screws and three #4 external tooth washers are used to attach the brace to the rear panel. Tighten the three remaining screws into the top of the side panel flange.

q. Install the X-shaped strengthening brace to the bottom of the control unit. The brace is equipped with four tapped mounting holes which are positioned inside

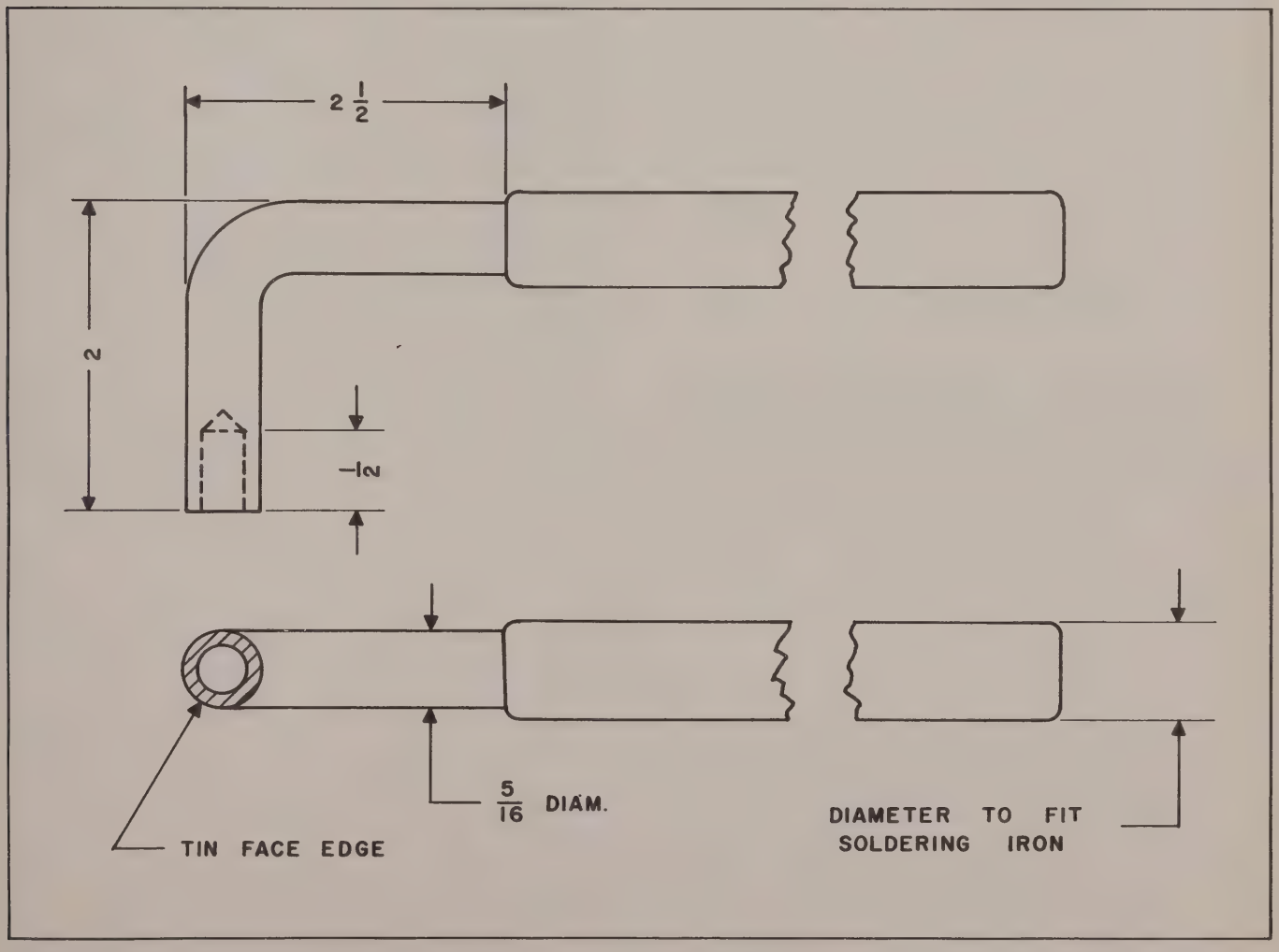


Figure 3-20. Soldering Iron Tip For Ceramic Capacitors

the metal flanges on the bottom of the control unit, Install the four 4-40 x 1/4" Phillips head screws, with four #4 external tooth washers, through the bottom flanges and into the X-shaped strengthening brace.

r. Install the plastic front panel on the front of the control unit. The panel is held in place by the three panel light caps.

s. Install the channel preset button so that the inscribed white line is in a vertical position when the button is in the normal position, see figure 3-12.

t. Install the proper control knobs to the volume (VOL) control, function control, and sensitivity (SENS) control as illustrated in figure 3-12.

u. Install the frequency selector knobs. If the frequency selector cam drums have not been moved, as indicated in step i, the knobs should be positioned to 200.0. The tenth megacycle knob must be tightened with the setscrews provided.

v. To install the channel selector knob turn the channel selector drum so that the manual channel segment is positioned under the microswitch actuating fingers. The manual channel segment can be identified by all pins in the "up" position, and no locking collars on the actuating pins. Install the channel selector knob and, before tightening the setscrews, position the letter M under the white arrow. Tighten the setscrews securely since considerable pressure is exerted on the selector knob when changing channels.

w. Slide the unit into the dust cover and secure by turning the two Dzus fasteners at the rear of the unit one-quarter turn clockwise. Before returning the unit to active service, a thorough check of preset and selector action should be made with Radio Set Control C-1015/ARC-27A connected in a test setup to control Receiver-Transmitter RT-178/ARC-27. Check the channel preset system on frequencies of 230.0, 308.2, and 373.7 for proper operation.

3-34. CERAMIC FEEDTHROUGH CAPACITOR CARE AND REPLACEMENT.

3-35. Although the ceramic feedthrough capacitors on the Spectrum Amplifier and Main Receiver R-F Amplifier Subassemblies were replaced by a mica button type that is much less fragile, the ceramic variety is retained for the two front casting plugs, J-1401 and J-1403, to save space. These ceramic capacitors give good service unless damaged by carelessness. Once cracked, the likelihood of a direct or high resistance short circuit developing is great. When removing the Power Amplifier Subassembly, lift the chassis out slowly, carefully folding the transmitter antenna lead back under the unit to avoid catching it on the antenna relay. Care taken when removing this subassembly will prevent striking the feedthrough capacitors on J-1401 and possibly cracking them.

3-36. REPLACEMENT OF CAPACITORS. The replacement of a ceramic feedthrough capacitor in J-1401 or J-1403 requires loosening the plug from the front casting and bringing the plug up out of the RT-178/ARC-27 far enough to get at the capacitors easily. A spanner wrench is needed to loosen the nut holding the threaded end of the receptacle to the casting. Refer to figure 3-18 to 3-19. The wire or wires connected to the damaged capacitor should be unsoldered. When using a soldering iron in such confined spaces, care should be taken to avoid harming adjacent capacitors by bumping or overheating them. When the wire connection is removed, the flange of the ceramic piece must be evenly heated all around its circumference where it joins the plate of the plug. This is difficult with an ordinary iron. Its wattage may be so low that heat is dispersed throughout the plug rather than concentrated on the capacitor, with the result that as one portion of the joint melts, another portion may solidify. Therefore, it is sometimes necessary to remove the twelve screws that hold the enclosing metal shield around the filter section, and slide the cylinder toward the lettered end of the plug. A soldering iron tip similar to that shown in figure 3-20 is recommended for shops doing this type of repair work in quantities that warrant the tip's construction. The tip is made of copper rod of the required diameter to fit a specific iron, but the face end of the rod is machined to a diameter of about 5/16 of an inch. After heating the whole flange until the solder melts, the small blade of a knife can be wedged between the flange and plate to loosen the capacitor. After removing the ceramic capacitor and cleaning the hole of excess solder, the new ceramic feedthrough capacitor can be placed into the hole and a small amount of solder used to sweat it to the plate. Resoldering of the wire or wires removed completes the repair. Care should be taken not to efface the lettering on the plate.

the metal flanges on the bottom of the control unit, Install the four 4-40 x 1/4" Phillips head screws, with four #4 external tooth washers, through the bottom flanges and into the X-shaped strengthening brace.

r. Install the plastic front panel on the front of the control unit. The panel is held in place by the three panel light caps.

s. Install the channel preset button so that the inscribed white line is in a vertical position when the button is in the normal position, see figure 3-12.

t. Install the proper control knobs to the volume (VOL) control, function control, and sensitivity (SENS) control as illustrated in figure 3-12.

u. Install the frequency selector knobs. If the frequency selector cam drums have not been moved, as indicated in step i, the knobs should be positioned to 200.0. The tenth megacycle knob must be tightened with the setscrews provided.

v. To install the channel selector knob turn the channel selector drum so that the manual channel segment is positioned under the microswitch actuating fingers. The manual channel segment can be identified by all pins in the "up" position, and no locking collars on the actuating pins. Install the channel selector knob and, before tightening the setscrews, position the letter M under the white arrow. Tighten the setscrews securely since considerable pressure is exerted on the selector knob when changing channels.

w. Slide the unit into the dust cover and secure by turning the two Dzus fasteners at the rear of the unit one-quarter turn clockwise. Before returning the unit to active service, a thorough check of preset and selector action should be made with Radio Set Control C-1015/ARC-27A connected in a test setup to control Receiver-Transmitter RT-178/ARC-27. Check the channel preset system on frequencies of 230.0, 308.2, and 373.7 for proper operation.

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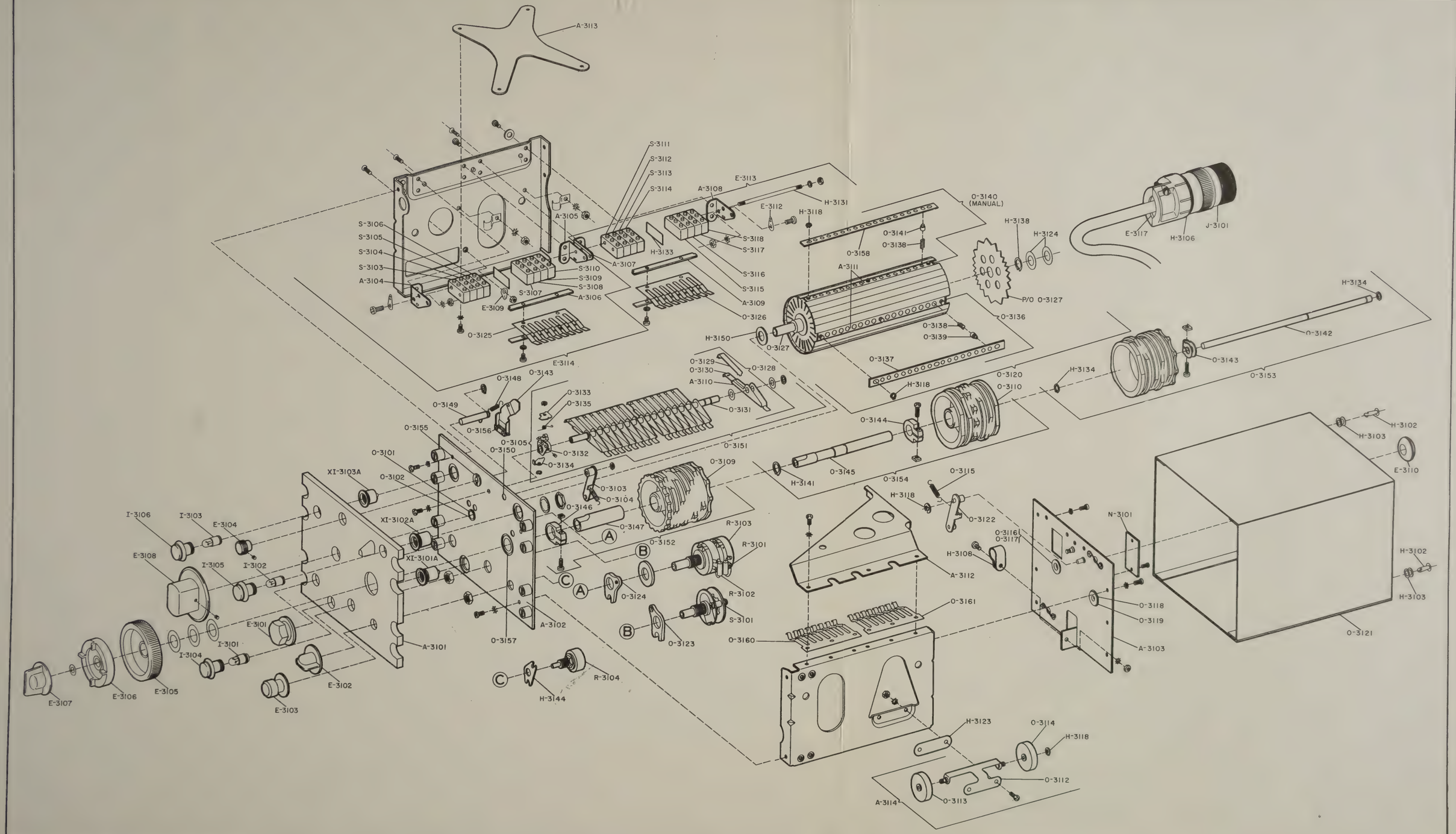


Figure 3-21. Radio Set Control C-1015/ARC-27A, Exploded View

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SECTION IV
DISMANTLING AND DISASSEMBLY

4-1. INTRODUCTION.

4-2. This section describes the procedures preparatory to overhaul, including dismantling of the equipment into its subassemblies or assemblies, and disassembly into parts. The extent to which the dismantling processes are carried will be determined by the authority in charge of overhaul, according to the condition of the equipment. In most instances, it will probably not be necessary to dismantle the equipment to the extent covered by these instructions. Disassembly is limited to the removal of mechanical items, such as gears, bearings, shafts, armatures, and brushes. Internal wiring, resistors, or capacitors are not removed unless such action is necessary for access to a part requiring overhaul.

4-3. Where tables containing disassembly instructions appear in this section, the sequence of the index numbers listed in the first column of each table corresponds to the sequence of procedural steps, thus indicating the order in which the parts are loosened, removed, or otherwise affected.

4-4. DISMANTLING.

4-5. RECEIVER-TRANSMITTER RT-178/ARC-27. To dismantle the Receiver-Transmitter RT-178/ARC-27 refer to figures 4-1 and 4-2 and proceed with dismantling as given in the following outline.

4-6. To gain access to the main chassis of the RT-178/ARC-27, the valve in either one of the two front panel valve stems should be depressed until no difference in air pressure exists between the inside and outside of the RT-178/ARC-27 case. If the air pressure is not equalized before loosening the front casting screws, the rubber gasket between the case and the front casting may blow out of its retaining groove and fit improperly when replaced. When removing the main chassis from the case, place the rear wall of the RT-178/ARC-27 case flat against the floor. A number 8 Allen wrench, supplied with the equipment, is used to loosen the 16 screws which secure the front casting to the case. Remember to loosen the four screws on the bottom of the front casting which are obscured by parts of the blower motor assembly.

4-7. When the front casting screws have been loosened, the main chassis can be lifted out of the case, raised to a horizontal position, and laid carefully on a bench. Since the gasket in the groove around the front casting may become permanently stretched if it is handled, the gasket should not be removed from the groove except for replacement. If work on the chassis is prolonged, the chassis should be fitted into a jig to facilitate rapid access to all sides of the chassis and to prevent damage to the exposed parts. If necessary, either side plate of the main chassis may be removed for access to certain parts of the unit, but in this case the Receiver-Transmitter RT-178/ARC-27 should be turned on the side opposite to that of the removed plate, so that the weight of the units does not bend the chassis and cause misalignment. It is important that only one side plate be removed at a time, since the other side plate will provide some rigidity for the main chassis. Careful handling of the set is particularly necessary when a side plate is removed, as exposed parts, such as tubes and relays, may be easily damaged. To aid the technician in removing a subassembly, the screws which secure the subassemblies are colored red. They must be loosened, but need not be completely removed, to free the subassemblies. It is important that a screwdriver of the proper size be used to prevent damage to the heads of the screws. To avoid bending pins on the subassembly plugs, rock the plugs loose from their chassis sockets as the subassembly is taken out. Insert the plugs cautiously when returning the subassembly to the main chassis, checking for proper alignment between the pins and sockets.

4-8. GUARD RECEIVER SUBASSEMBLY.

a. When removing the Guard Receiver Subassembly, it is necessary to remove the back gusset brace. Avoid chafing the insulation on the wires leading to the power plug of the Mechanical Drive Subassembly.

b. Loosen the four captive screws until they turn freely. These screws need not be completely removed.

c. Disconnect the antenna input connector from its mating part.

d. Grasp the receiver near the rear of the chassis and by the handle, lift it out, being careful to avoid damage to the 15 prong connector, cable, and wires to the mechanical drive plug (P-1514).

4-9. BIAS RELAY SUBASSEMBLY.

CAUTION

In Bias Relay Subassembly removal, it should be remembered that even when the ON-OFF switch on the Master Control Unit is in the OFF position, primary voltage enters the RT-178/ARC-27 and is applied to the power relay beneath the Bias Relay Subassembly. Destructive arcing may result if the relay is accidently shorted to ground unless the fuse is pulled from the junction box or the power is turned off at the junction box.

a. Loosen the four captive screws until they turn freely.

b. Disconnect the two BNC connectors on the antenna relay subassembly and move these cables out of the way.

c. Grasp the subassembly near the front and rear of the chassis and lift it out.

4-10. POWER AMPLIFIER SUBASSEMBLY.

a. When removing the Power Amplifier Subassembly, loosen the three mounting screws toward the inboard side of the subassembly only enough to allow the hold-down clamps to be turned 90 degrees. If these screws are inadvertently taken out, much time may be spent in searching for the washers and hold-down clamps which are freed from the main chassis.

NOTE

For removal of any subassembly driven by the Mechanical Tuning Drive, it is preferable that the frequency of the system first be set at 200.0 mcs. This will set the Oldham couplers in a position favorable to the removal of the Mechanical Tuning Drive later if necessary.

b. Unscrew the three mounting screws toward the outside of the subassembly until they turn freely.

c. Power Amplifier removal is simplified if the 2C43 tube and its socket are taken from the subassembly previous to removal of the subassembly from the main chassis. To remove this tube and its socket, remove tube V-509 from its socket and take out the screw which holds the socket of the 2C43 tube to the subassembly. While supporting the plate clamp of the tube with a screwdriver, slowly rock the tube and socket out, taking care not to crack the ceramic part of the plate clamp. When replacing this tube and its socket, the reverse procedure is used.

d. Mark the mating gears between the Power Amplifier Subassembly and the Mechanical Tuning Drive to be sure that the Power Amplifier may be replaced with exactly the same gear tooth mating with those of the Mechanical Tuning Drive. Failure to do this will result in loss in synchronization.

NOTE

Since these mating gears do not have the same number of teeth, these marks once made may not necessarily line up the next time the subassembly is removed. The marks made will repeat in alignment once for every 13 rotations of the Mechanical Tuning Drive gear. This particular alignment may be achieved by using an extension cable for the Bias-Relay Subassembly to permit observation of the gears. The Mechanical Tuning Drive may now be reset to 200.0 megacycles until the marks on the gears come into the desired alignment. Avoid placing extra marks on these gears as they could become confusing in future realignment work.

e. Disconnect the BNC connector on the antenna relay which terminates the cable from the Power Amplifier.

f. Disconnect plug P-503 and jack J-603 between the Power Amplifier and the Spectrum Amplifier Subassembly.

g. Remove the plug P-607 from its mating socket J-1507.

h. Slide the unit toward the front casting just enough to separate the mating gears and lift the Power Amplifier Subassembly out from the main chassis.

4-11. MECHANICAL DRIVE SUBASSEMBLY.

a. Turn the power OFF.

b. Remove the Bias-Relay Subassembly as in paragraph 4-9.

c. Mark the mating gears between the Power Amplifier and the Mechanical Drive Subassembly as indicated in paragraph 4-10, making sure the frequency of the system is 200.0 megacycles.

d. Loosen the Power Amplifier Subassembly and slide it forward slightly to permit the removal of the Mechanical Drive Subassembly.

e. Remove receptacle J-1514 from its mating plug.

f. Unscrew the four mounting screws (painted red) which hold the subassembly to the main chassis.

g. Carefully lift the subassembly out of the unit, taking care that the floating part of each Oldham coupler either stays with its driven unit or that it is removed and carefully marked for exact replacement.

h. If the subassembly is operated, or otherwise rotated while it is removed from the set, it will be necessary that it be returned to the position corresponding to a frequency of 200.0 megacycles before it is replaced in the set. This is absolutely necessary to retain synchronization and alignment between the different driven subassemblies.

4-12. SPECTRUM AMPLIFIER.

a. Set the frequency of the system to 200.0 megacycles. (In this case, this procedure is not strictly necessary, but it provides a good reference point for reassembly.)

b. Check the power to be sure it is turned OFF.

c. Remove Guard Receiver Subassembly (see paragraph 4-8).

d. Unscrew the nine mounting screws (painted red) around the edge of the chassis.

e. Disconnect plug P-503 and jack J-603 between the Spectrum Amplifier Subassembly and the Power Amplifier Subassembly.

f. Remove plug P-506 from its mating socket J-1506.

g. Disconnect Z-104 cable as directed in paragraph 4-17 d before removing Spectrum Amplifier Subassembly.

h. Lift the subassembly from the unit.

i. The floating part of each Oldham coupler should be carefully marked so that it may be replaced in exactly the same position. If the gear train is turned while the subassembly is removed from the unit, it must be returned to the same position before replacement. If the Mechanical Drive Subassembly has been set at 200.0 megacycles before disassembly, as recommended above, this will correspond to the low frequency end where the capacitor plates are meshed.

4-13. SPECTRUM OSCILLATOR SUBASSEMBLY.

a. For Spectrum Oscillator Subassembly removal the captive screw beneath the Modulator Subassembly can be reached through a hole in the Modulator Subassembly. The unit should be lifted straight up, or lowered straight down, to the proper mounting position to prevent damage to the r-f output coaxial connectors. This subassembly can be removed from the back of the Receiver-Transmitter RT-178/ARC-27 without removing the back gusset brace.

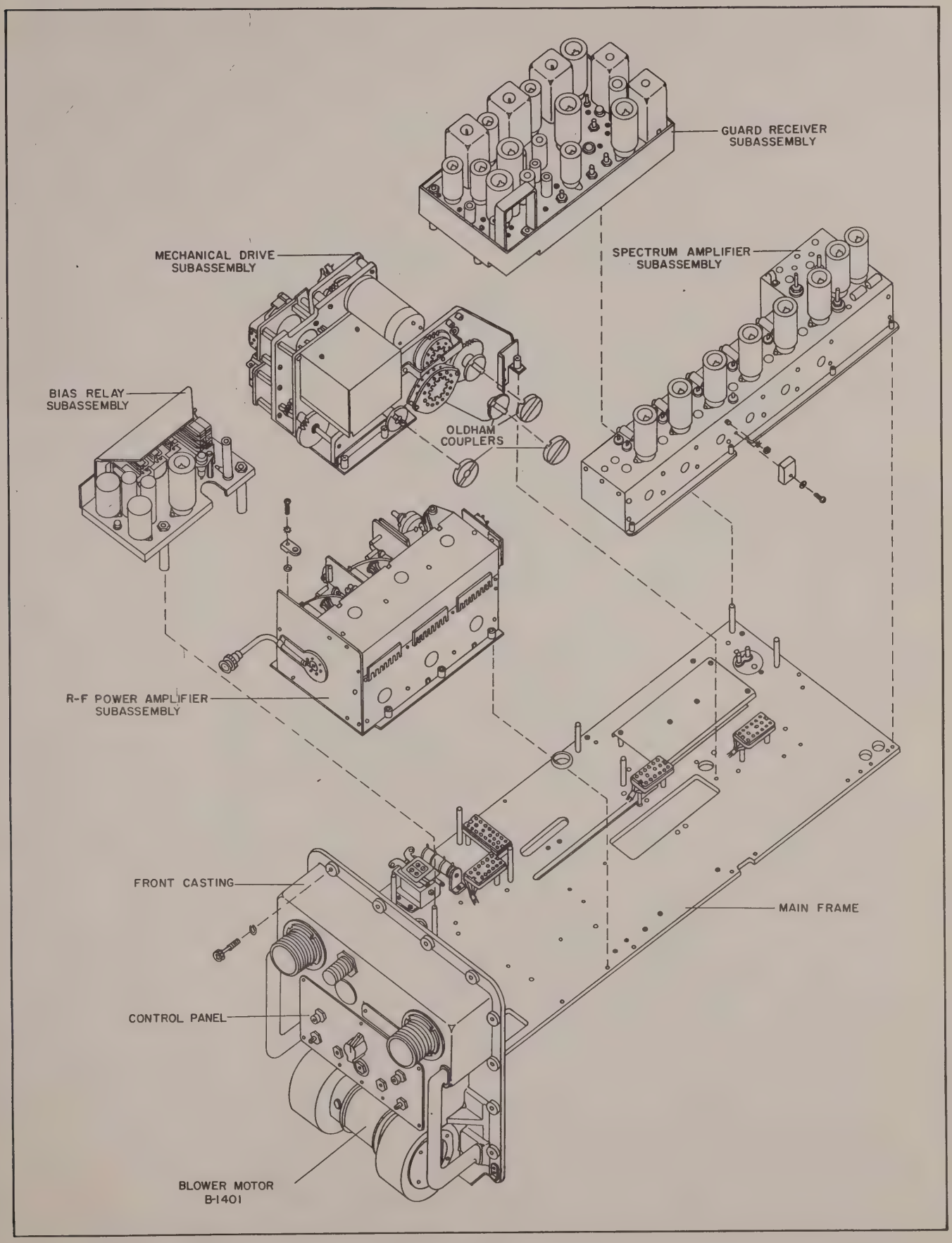


Figure 4-1. Receiver-Transmitter RT-178/ARC-27, Top View, Exploded View

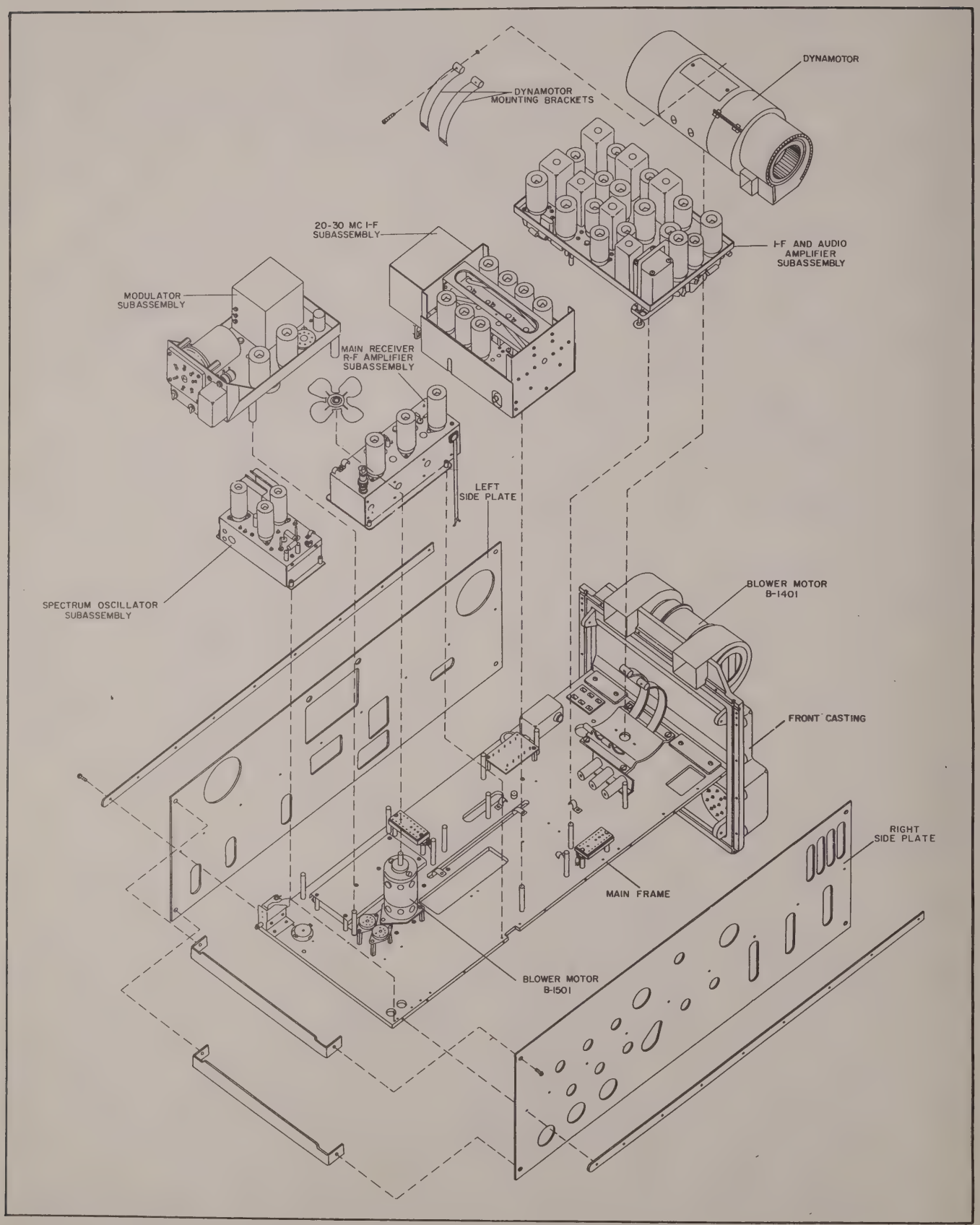


Figure 4-2. Receiver-Transmitter RT-178/ARC-27, Bottom View, Exploded View

4-14. I-F AND AUDIO AMPLIFIER.

a. Unscrew the four captive screws until they turn freely.

b. Grasp the subassembly by the handle over the audio transformer and carefully work it free of its power connector. Since the connector is directly below the audio transformer, most of the force should be applied at this point. However, care should be taken to see that the subassembly is kept fairly well parallel to its original position to avoid jamming.

4-15. DYNAMOTOR.

a. Remove the I-F and Audio Amplifier. (See paragraph 4-14.)

b. Remove the two screws which clamp the encircling bands holding the subassembly in place.

c. Manipulate the two band-sectors nearest the I-F and Audio Subassembly until they can be removed.

d. Grasp the dynamotor by each end and rock it back and forth until it is disengaged from its mating plug connector J-1509.

4-16. MODULATOR.

a. The Modulator Subassembly may be removed from the main chassis without loosening the fan blade mounted above it.

b. Remove the back gusset brace from the main chassis frame.

c. Loosen the captive screws and remove the power plug from the subassembly.

d. Slide the Modulator Subassembly toward the rear of the main chassis, let the fan blade act as a turnstile as the two 12AT7 tubes pass, and remove the subassembly from the rear of the unit.

4-17. MAIN RECEIVER R-F AMPLIFIER SUBASSEMBLY.

a. Set the frequency of the system to 200.0 megacycles.

b. Check the power to see that it is turned OFF.

c. Disengage the power connector P-101 from its mating connector, and the r-f connector from J-101.

d. A hexagonal nut-driver type (Spintite) wrench is recommended for loosening the nut which holds the lug of the black cable, Z-104, to the Spectrum Amplifier Subassembly. The lug should be supported while rotating the nut, since the wire soldered to the lug is easily broken. Place the Main Receiver R-F Amplifier Subassembly on its side after it has been removed from the main chassis. This will prevent damage to the end of the cable.

e. Unscrew the four captive screws until they turn freely.

f. Lift the subassembly from the unit.

4-18. 20-30 MEGACYCLE AMPLIFIER.

a. Set the system frequency to 200.0 megacycles, the reference frequency.

b. Check the power to be sure it is turned OFF.

c. Unscrew the four captive screws until they turn freely.

d. Grasp the subassembly by the frame and lift it partially out of the set.

e. Disengage the power connector P-1504 from its mating connector.

f. Note the exact position of the gear train to avoid possible synchronization problems.

g. The subassembly may now be lifted the rest of the way out of the unit.

4-19. BLOWER MOTOR B-1501. To remove blower motor B-1501, refer to figure 4-2 and proceed as follows:

a. Remove the three screws holding the blower motor to its supporting standoffs. Raise the motor and unsolder the wires connecting it to the chassis, carefully noting their positions and dress. Remove the motor and its mounting bracket.

4-20. BLOWER MOTOR B-1401. To remove blower motor B-1401, refer to figure 4-1 and proceed as follows:

a. Remove the four screws securing the motor to the front casting.

b. Unsolder the power leads from the meter panel.

c. Remove the blower motor.

4-21. DISASSEMBLY.

4-22. BLOWER MOTOR B-1501. To disassemble blower motor B-1501, refer to figure 4-3 and proceed as directed in Table I.

TABLE I. BLOWER MOTOR B-1501 DISASSEMBLY

Index No.	Item	Procedure
1	Setscrew	Loosen setscrew (1) securing fan (2) to motor shaft and remove fan (2). Remove retainer clips (3), brush caps (4) and brushes (5). Remove two slotted nuts (6) securing front casting (7) and remove front casting (7). Remove armature (8). Remove front bearing (9) and rear bearing (10) from armature (8). Remove three screws (11) securing mounting bracket (12). Loosen cap assembly (13) and unsolder brush leads (14) after first carefully noting their location. Separate field assembly (15) and cap assembly (13). Remove frame screws (16).
2	Fan	
3	Retainer clips	
4	Brush caps	
5	Brushes	
6	Slotted nuts	
7	Front casting	
8	Armature	
9	Front bearing	

TABLE I. BLOWER MOTOR B-1501 DISASSEMBLY (Cont.)

Index No.	Item	Procedure
10	Rear bearing	
11	Screws	
12	Mounting bracket	
13	Cap assembly	
14	Brush leads	
15	Field assembly	
16	Frame screws	

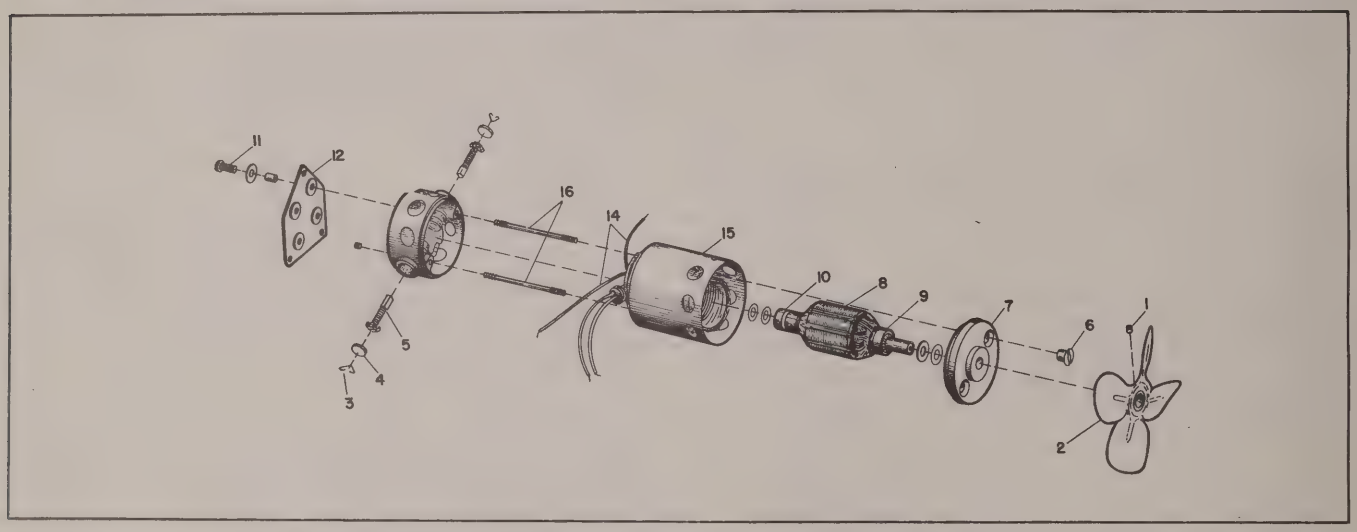


Figure 4-3. Blower Motor B-1501, Exploded View

4-23. AUTOTUNE MOTOR B-1601 AND AUTOPOSITIONER MOTOR B-1201. To disassemble these motors refer to figure 4-4 and proceed as directed in Table II.

TABLE II. DISASSEMBLY OF AUTOTUNE MOTOR B-1601

Index No.	Item	Procedure
1	Retainer clips	Remove retainer clips (1), rubber brush caps (2) and brushes (3). Remove frame screws (4). Remove top casting (5) and bottom casting (6). Remove armature (7) from field assembly (8). Remove front bearing (9) and rear bearing (10) from armature (7).
2	Brush caps	
3	Brushes	
4	Frame screws	
5	Top casting	
6	Bottom casting	
7	Armature	
8	Field assembly	
9	Front bearing	
10	Rear bearing	

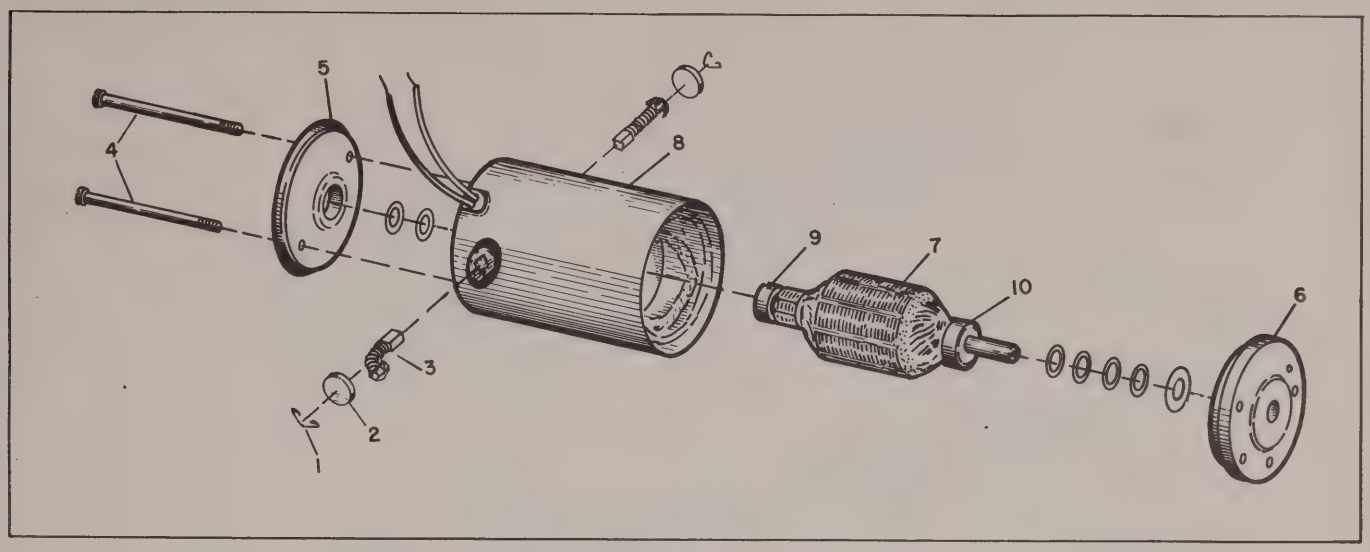


Figure 4-4. Autotune Motor B-1601 and Autopositioner Motor B-1201, Exploded View

4-24. BLOWER MOTOR B-1401. To disassemble blower motor B-1401, refer to figure 4-5 and proceed as follows:

TABLE III. DISASSEMBLY OF BLOWER MOTOR B-1401

Index No.	Item	Procedure
1	Screw	Remove three screws (1) securing blower grill (2) and remove blower grill (2). Reach through the blower housing exhaust and loosen the set-screw securing the impeller (3) to the motor shaft. Remove the impeller (3). Remove four screws (4) securing the blower housing (5) to the motor and remove the blower housing (5). Remove brush caps (6) and brushes (7). Remove four screws (8) securing mounting bracket (9) and remove mounting bracket (9). Remove three screws (10) securing end plate (11) and remove end plate (11). Remove two screws (12) securing front casting (13) and remove front casting (13). Remove armature (14). Remove two screws (15) securing rear casting assembly (16). Loosen rear casting assembly (16) and unsolder brush leads (17). Separate rear casting assembly (16) and field assembly (18). Remove front bearing (19) and rear bearing (20) from armature (14).
2	Blower grill	
3	Impeller	
4	Screw	
5	Blower housing	
6	Brush caps	
7	Brushes	
8	Screw	
9	Mounting bracket	
10	Screws	
11	End plate	
12	Screws	
13	Front casting	
14	Armature	
15	Screws	
16	Rear casting assembly	
17	Brush leads	
18	Field assembly	
19	Front bearing	
20	Rear bearing	

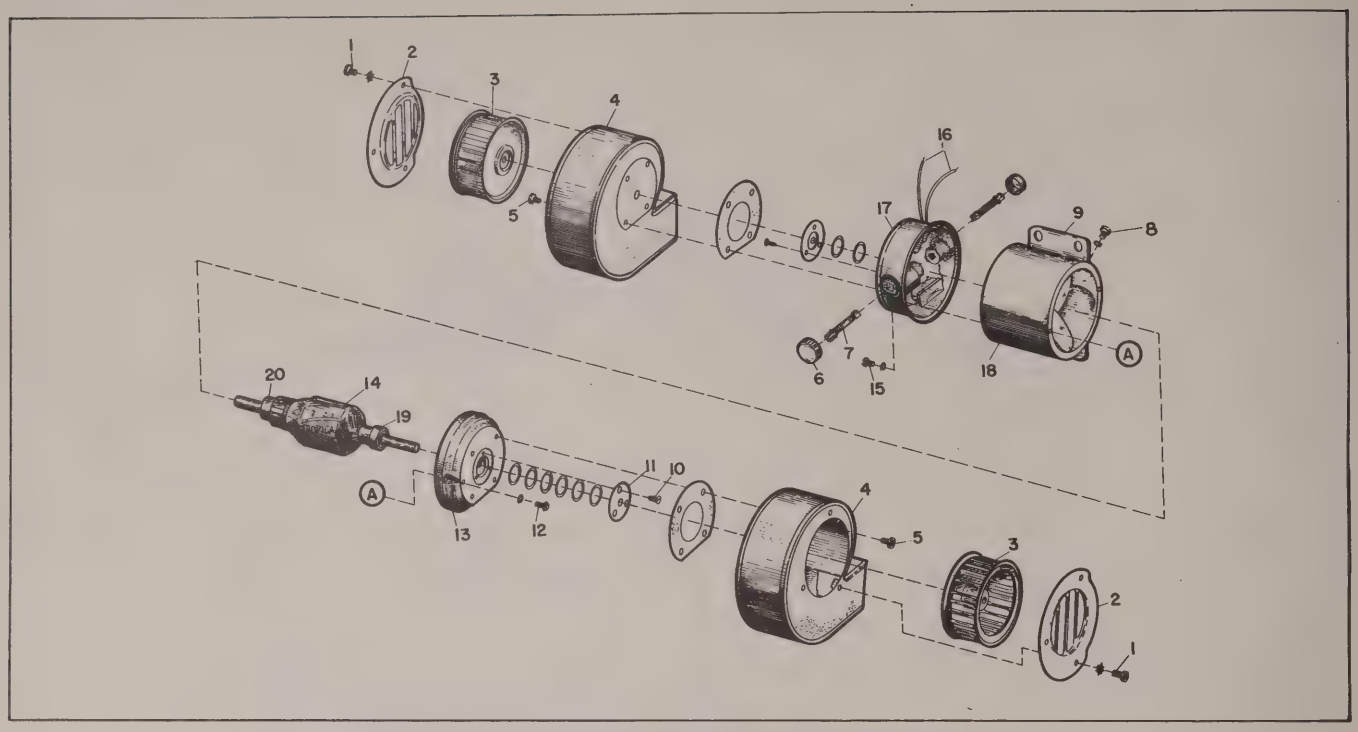


Figure 4-5. Blower Motor B-1401, Exploded View

4-25. DYNAMOTOR. To disassembly the Dynamotor, refer to figures 4-6 for Gothard, 4-7 for Wincharger, 4-8 for Continental and 4-9 for Electrolux; then proceed as directed in Table IV.

TABLE IV. DISASSEMBLY OF DYNAMOTOR

Index No.	Item	Procedure
1	Setscrew	Reach through the exhaust of the blower casing and loosen setscrew (1) securing the impeller (2) and remove impeller (2). Remove two Phillips head screws (3) securing the blower casing (4) and remove the blower casing (4). Loosen the two bolts (5) securing the flexible metal strap (6) and remove it. On Wincharger and Gothard dynamotors (see figure 4-7 and 4-6), remove the two Phillips head screws (7) securing the end plate (8). Remove the 27.5-volt brush caps (9) and brushes (10). Remove the 210-volt brush caps (11) and brushes (12). Remove the 400-volt brush caps (13) and brushes (14). Remove two frame screws (15). Remove the front and rear casting assemblies. Remove the armature (16) from the field assembly (17). Remove the front bearing (18) and rear bearing (19).
2	Impeller	
3	Phillips head screw	
4	Blower casing	
5	Bolt	
6	Flexible strap	
7	Phillips head screw	
8	End plate	
9	27.5-volt brush caps	
10	27.5-volt brushes	
11	210-volt brush caps	
12	210-volt brushes	
13	400-volt brush caps	
14	400-volt brushes	
15	Frame screws	
16	Armature	
17	Field assembly	
18	Front bearing	
19	Rear bearing	

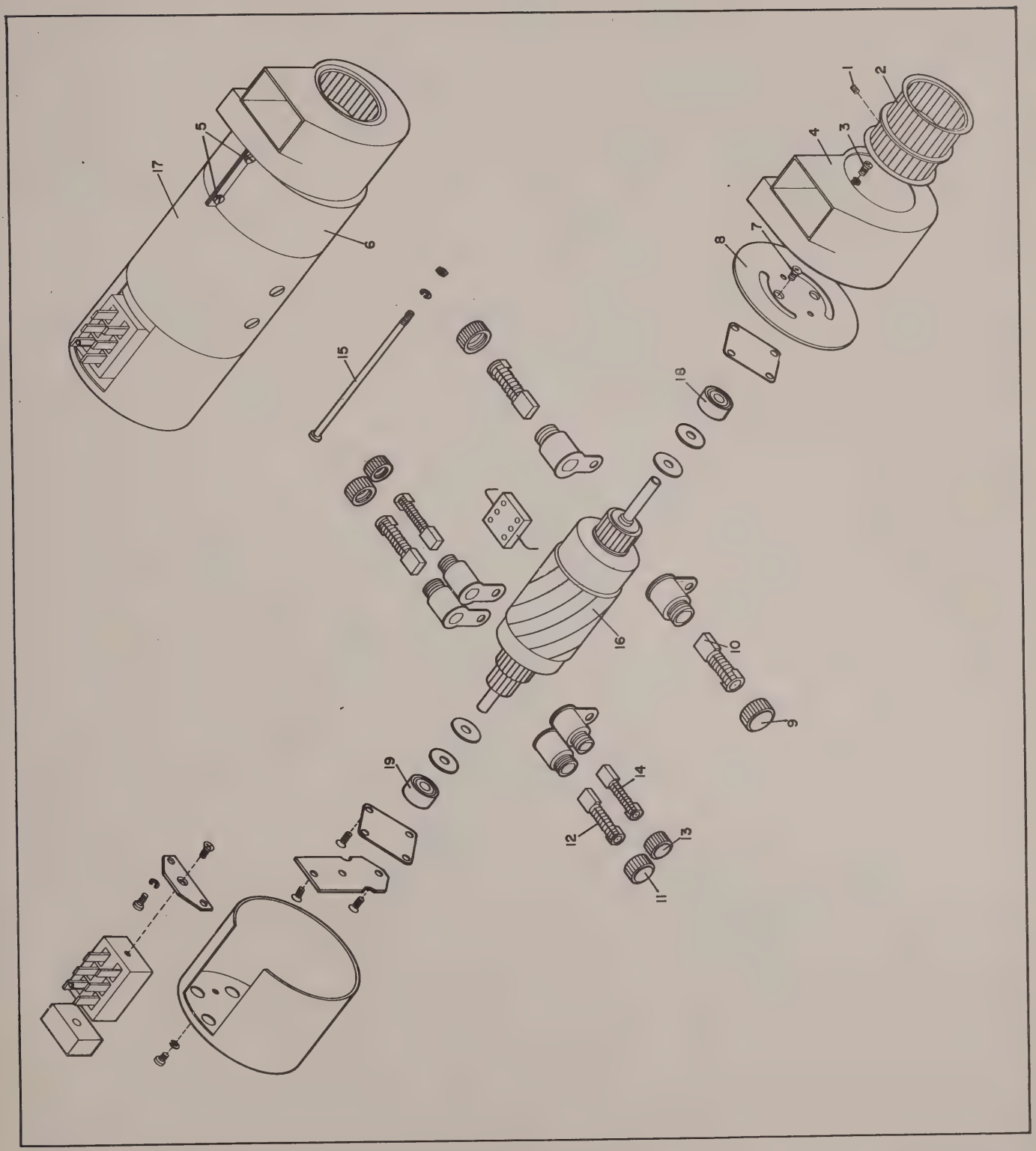


Figure 4-6. Gothard Dynamotor, Exploded View

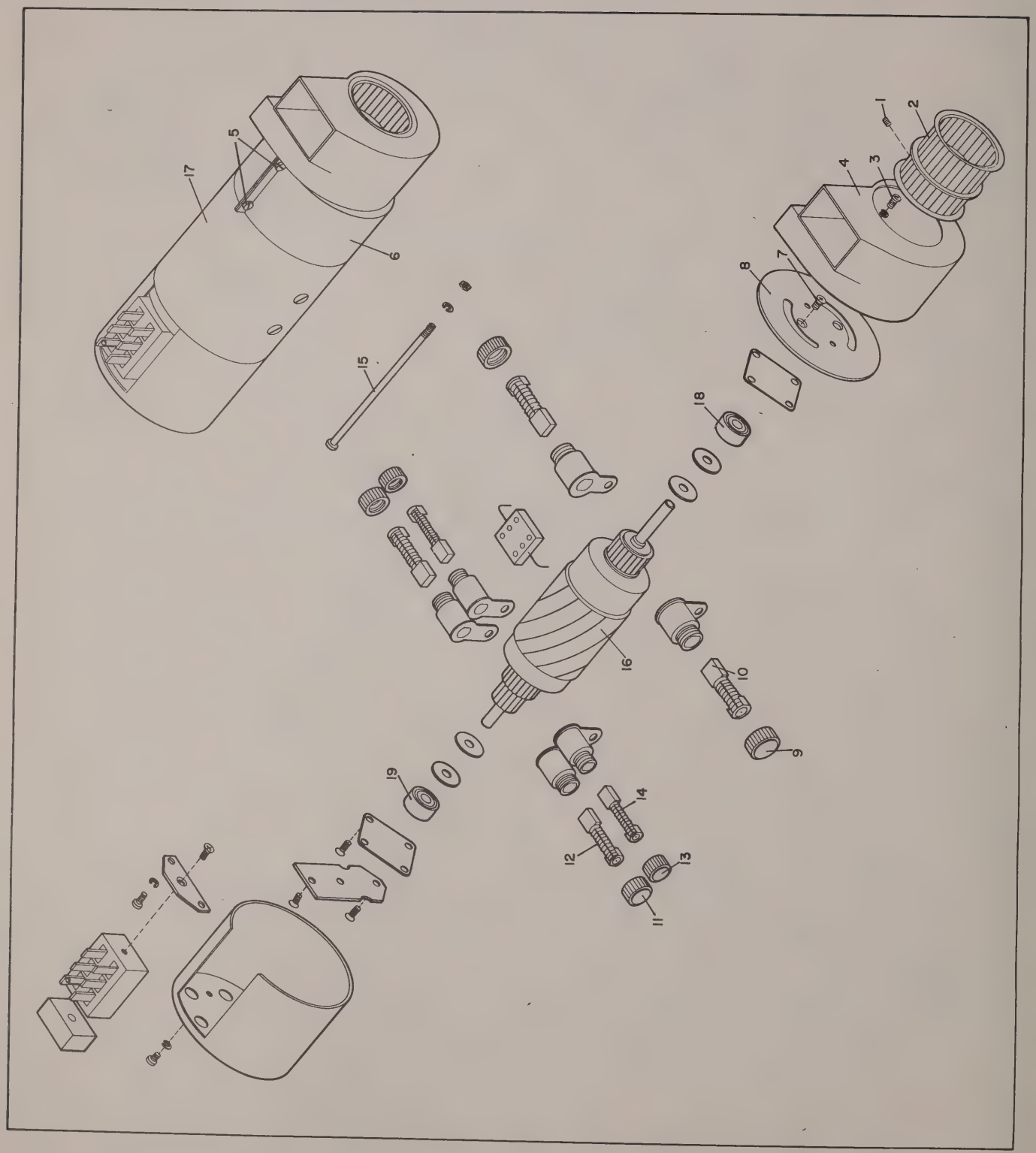


Figure 4-7. Wincharger Dynamotor, Exploded View

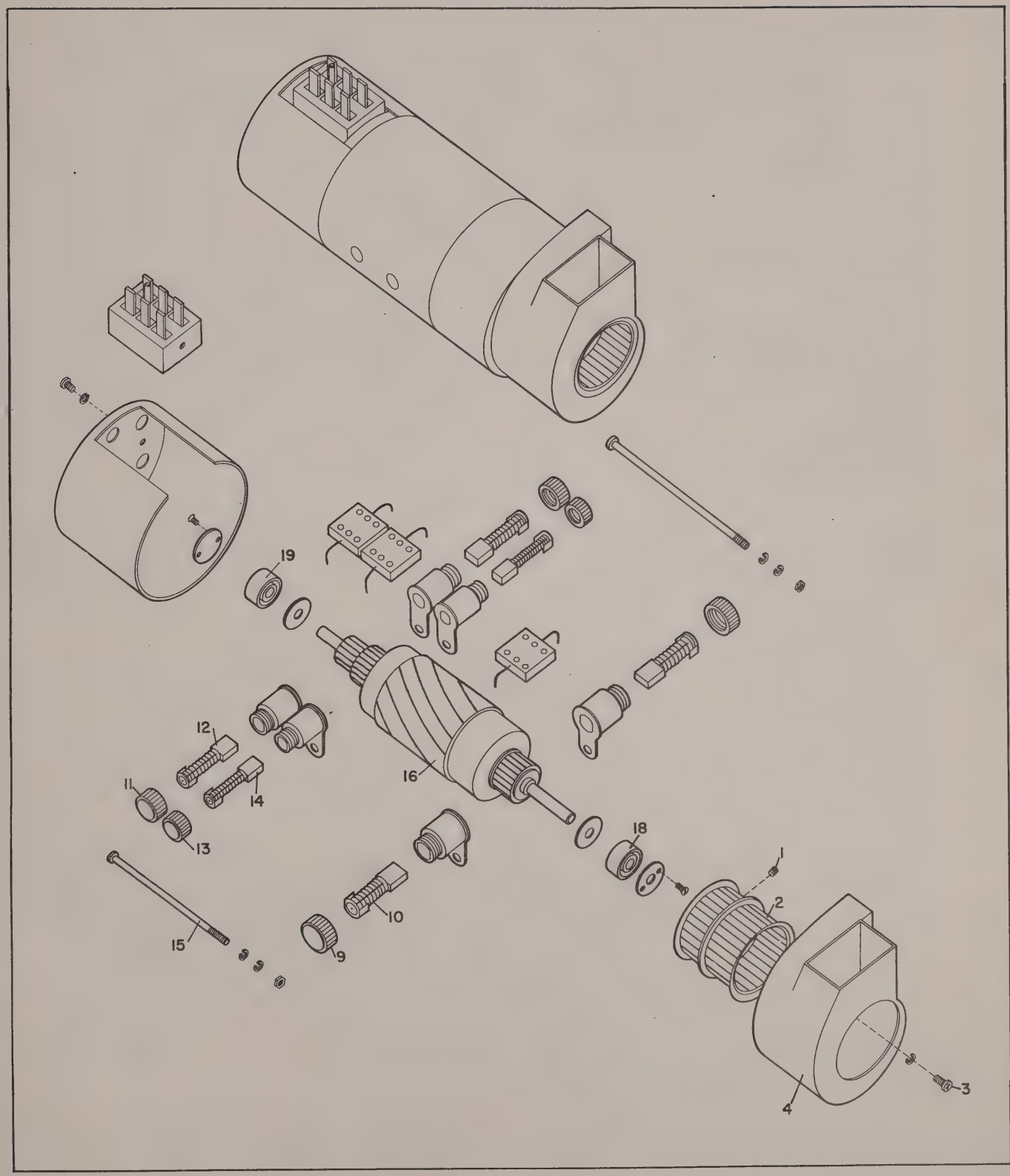


Figure 4-8. Continental Dynamotor, Exploded View

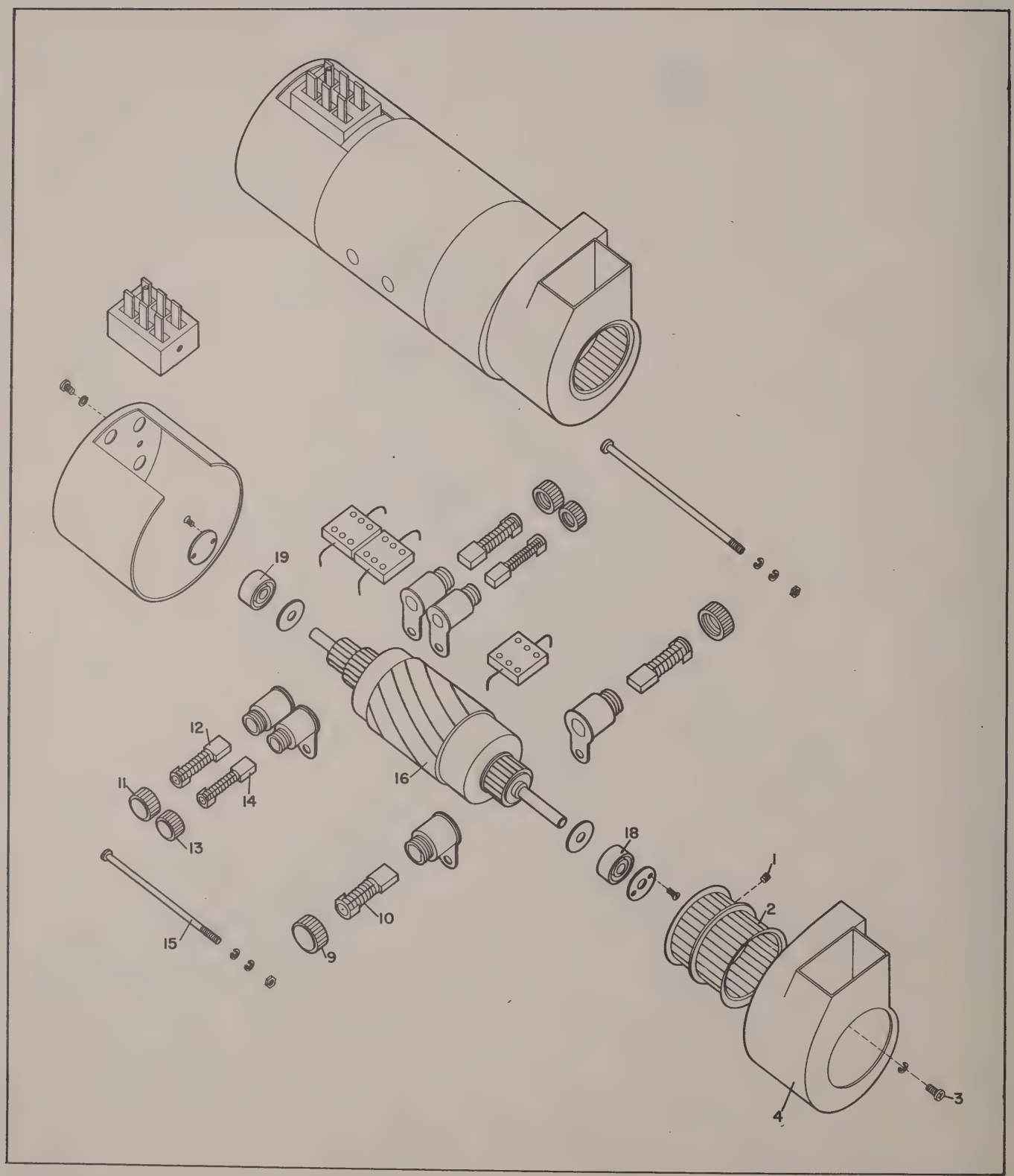


Figure 4-9. Electrolux Dynamotor, Exploded View

SECTION V
CLEANING

5-1. INTRODUCTION.

5-2. This section contains instructions and procedures for cleaning the dismantled and disassembled components, subassemblies, assemblies and parts of Radio Sets AN/ARC-27 and AN/ARC-27A.

5-3. Component cleaning instructions and procedures are alphabetically arranged in paragraph 5-7. Wherever feasible, instructions are in tabular form, arranged to facilitate reference by paragraph to the procedure for cleaning the various parts and assemblies.

5-4. All parts requiring particular methods of cleaning are considered separately, and parts which are of such similar nature as to permit identical cleaning procedures are grouped wherever possible in paragraph 5-22. Instructions are given for cleaning finished surfaces, in order to permit immediate repairs to minor finish damage by brush touch-up after the surface has been cleaned.

5-5. Reference to the word solvent shall be understood as indicating a mixture comprising methylene chloride, 25 percent; perchlorethylene, 5 percent; and dry cleaning solvent, Federal Spec P-S-661a, 70 percent, by volume. All referenced cleaning materials and protective agents are listed and identified in Table V.

WARNING

Perform operations involving cleaning solvent under a ventilated hood. Avoid breathing solvent vapor; wear a suitable mask when necessary. Avoid continuous contact with a solvent. Use goggles, gloves, and apron to prevent irritation due to prolonged contact. Change clothing that has become saturated with solvents.

5-6. References tc air jet, frequently made in Section V, signify a hand-operated air nozzle supplied with clean, dry, compressed air at a pressure of 25 to 28 psi maximum.

WARNING

Goggles should be worn when using air jet to blow dust and dirt from equipment parts. Other persons should be warned away from hazardous area or working enclosure.

TABLE V. CLEANING MATERIALS AND PROTECTIVE AGENTS

Material	Specification	ASO Stock No.
Solvent; a mixture by volume of:		
Methylene chloride 25 percent	ANA Spec. AN-M-37	R51-M-950-20
Perchlorethylene 5 percent	Fed. Spec. O-T-236	R51-T-4459-200
Solvent, dry cleaning 70 percent	Fed. Spec. P-S-661a	R51-C-1326-75
Chamois skin		
Cloth, cotton: lintless		
Detergent, powder (Dreft)		
Oil, lubricating	MIL-L-7870	R14-O-2405-20
Oil, lubricating: refrigerating machine	Fed. Spec. VV-O-581	
Paper, lens tissue		
Paper, tissue: fine grade		
Solvent, dry cleaning	Fed. Spec. P-S-661a	R51-C-1326-75
Tool, burnishing		R41-T-3080
Trichloroethylene	AN-O-T-631	R51-T-5780

5-7. COMPONENTS.

5-8. The following paragraphs contain instructions and procedures for cleaning the various parts of the dismantled and disassembled equipment preparatory to the inspection procedures found in Section VI. Cleaning instructions are listed for each component in tabular form, and opposite each part to be cleaned reference is made by paragraph to the proper procedure. These procedures are found in paragraph 5-22 or immediately following the table of instructions for each component.

5-9. AN/ARC-27 REMOTE RADIO SET CONTROL UNITS. To clean dismantled Radio Set Control Units C-628/ARC-27, C-628A/ARC-27, C-627/ARC-27, C-911/ARC-27, C-868/ARC-27, C-905/ARC-27, C-906/ARC-27, C-912/ARC-27, C-853/ARC-27, C-913/ARC-27 and C-914/ARC-27 proceed as directed in Table VI.

TABLE VI. CLEANING AN/ARC-27 RADIO SET CONTROL UNITS

Item	Paragraph
Wired chassis	5-32
Cover	5-35
Knobs	5-37
Mechanical metal parts	5-53
Molded plastic parts	5-55
Lamps	5-48
Lamp holders	5-47

5-10. AN/ARC-27A REMOTE RADIO SET CONTROL UNITS. To clean Radio Set Control Units C-1015/ARC-27A, C-1024/ARC-27A, and C-1025/ARC-27A proceed as directed in Table VII. These control units are not normally disassembled as part of the overhaul procedure, because of their complexity, but all parts to be cleaned are accessible by removing the dust covers.

TABLE VII. CLEANING AN/ARC-27A RADIO SET CONTROL UNITS

Item	Paragraph
Wired chassis	5-32
Cover	5-35
Knobs	5-37
Mechanical metal parts	5-53
Molded plastic parts	5-55
Lamps	5-48
Lamp holders	5-47

5-11. RECEIVER-TRANSMITTER RT-178/ARC-27. Clean the dismantled and disassembled Receiver-Transmitter RT-178/ARC-27 as directed in Table VIII.

TABLE VIII. CLEANING RECEIVER-TRANSMITTER RT-178/ARC-27

Item	Paragraph
Covered Cable	5-29
Castings	5-30
Wired chassis	5-32
Connectors	5-34
Covers and shields	5-35
Dials and knobs	5-37
Gaskets and seals	5-40
Metallic or fabric gears	5-42
Ceramic or mycalex insulators	5-44
Jacks	5-46
Machined metal parts	5-51
Mechanical metal parts	5-53
Molded plastic parts	5-55
Receptacles	5-59
Relays	5-61
Tube sockets	5-62
Sensitive and toggle switches	5-64
Rotary switches	5-65
Concentric r-f switches	5-67
Electron tubes	5-69

5-12. DYNAMOTOR. Clean the disassembled dynamotor as directed in Table IX.

TABLE IX. CLEANING DYNAMOTOR

Item	Paragraph
Armature	5-23
Bearings	5-24
End-spider assemblies	5-30
Connector	5-34
Dust covers	5-35
Frame and field assembly	5-39
Paper gaskets and fiber shim washers	5-41
Brush-holder caps	5-53
Fan	5-53
Frame bolts	5-53
Retainer plate and retainer-plate brackets	5-53
Mechanical metal parts	5-53

5-13. MOUNTING MT-822/ARC-27. Clean the receiver-transmitter mounting base as directed in Table X.

TABLE X. CLEANING MOUNTING MT-822/ARC-27

Item	Paragraph
Mechanical metal parts	5-53
Vibration mounts	5-57

5-14. MOUNTINGS MT-821/ARC-27, MT-4/ARR-2, MT-1075/ARC-27. Clean the radio set control mounting plates as directed in paragraphs 5-54 and 5-30.

5-15. RADIO SET CONTROL C-626/ARC-27.

5-16. AUTOTUNE CONTROL HEAD. Although the Autotune control head ordinarily is not disassembled during regular overhaul procedures, because of its complexity, it is necessary to remove the dust cover for cleaning of accessible parts and for inspection. For cleaning purposes, the Autotune control head is treated as a wired chassis, since it contains numerous wired parts which are not readily removable. Dust and dirt particles are removed from these assembled heads by the use of an air jet supplied with clean, dry, filtered air at a pressure of from 25 to 28 psi. Exercise care when using the air jet, to prevent future damage to parts by the scattering of dust and foreign particles. Wipe thoroughly all accessible parts with a clean, lintless cloth moistened with solvent. Then dry and polish all parts with a clean, dry, lintless cloth.

5-17. It is recommended that the bearing lock nuts on the positioning heads be loosened, and the outer races of the ball bearings on the main stop-ring shaft assembly be removed to expose the ball bearings. Check these bearings for cleanliness and lubrication. If the ball bearings and their races require cleaning, follow applicable procedures in this section for cleaning special ball bearings and machined metal parts. Protect cleaned positioning heads and their parts from dirt, moisture, and physical damage pending inspection. If

excessive dirt is present in any of the heads, or if the heads are defective, special maintenance is required; and the abnormal head is disassembled as described in Section III, cleaned according to applicable procedures in this section, inspected according to procedures in Section VI, and reassembled according to directions contained in Section III.

5-18. AUTOTUNE MOTOR B-1601. Clean the disassembled Autotune motor as directed in Table XI.

TABLE XI. CLEANING AUTOTUNE MOTOR B-1601

Item	Paragraph
Armature	5-23
Bearings	5-26
Front and rear housings	5-30
Frame and field assembly	5-39
Gear	5-43
Brush-holder caps	5-53
Frame screws	5-53
Mechanical metal parts	5-53

5-19. BLOWER MOTORS B-1401, B-1501. Clean the disassembled blower motors as directed in paragraph 5-18 and Table XI.

5-20. MECHANICAL DRIVE SUBASSEMBLY (AUTOPOSITIONER). The Mechanical Drive Subassembly is not normally disassembled in overhaul procedures. Access to all parts requiring cleaning and inspection is obtained by removing the subassembly from the Receiver-Transmitter RT-178/ARC-27 main chassis. Parts involving normal wear are exposed. Clean the subassembly as directed in Table XII.

TABLE XII. CLEANING MECHANICAL DRIVE SUBASSEMBLY

Item	Paragraph
Covered cable	5-29
Connectors	5-34
Metallic or fabric gears	5-42
Ceramic or mycalex insulators	5-44
Jacks	5-46
Machined metal parts	5-51
Mechanical metal parts	5-53
Molded plastic parts	5-55
Relays	5-61
Rotary switches	5-65

5-21. AUTOPOSITIONER MOTOR B-1201. Clean the disassembled Autopositioner motor as directed in paragraph 5-18.

5-22. SIMILAR PARTS.

5-23. ARMATURES, MOTOR OR DYNAMOTOR.

CAUTION

To prevent damage, armatures should not be rolled, or permitted to rest on their coils or commutators. They should be handled by the armature shafts whenever possible.

a. With air jet, blow dust and dirt from all surfaces and crevices.

WARNING

When using flammable materials for cleaning purposes, observe all fire precautions. These materials should only be used outside, or in a ventilated booth provided with explosion-proof electrical equipment and an exhaust fan having spark-proof blades.

b. Observing WARNING, remove any lubricants and remaining dirt by immersing armature in a washing bath of an approved solution, and wash clean with soft-bristled brush having no metallic parts. Remove from bath at once when clean, and drain.

CAUTION

Carbon tetrachloride, trichloroethylene, solvent or other cleaning agents with chlorine content should not be used for cleaning armatures, since poor commutation and excessive brush wear may result.

c. Immerse in rinse bath of an approved solution; rinse, remove from bath, and drain.
d. Rest on suitable metal screen in ventilated oven, and dry at approximately 105°C (221°F) for four hours.
e. Remove from oven, and lightly coat shaft with MIL-L-7870 oil.
f. Rest on shaft, and protect from dust and moisture pending inspection.

5-24. BEARINGS, BALL: NONSEALED.

5-25. These bearings can be cleaned for inspection in a bearing cleaning machine such as ASO Stock No. V40C969, using the cleaning agents and procedures recommended by its manufacturer. Otherwise, clean these bearings according to the following hand washing procedures.
a. Perform cleaning work in an air-conditioned or air-filtered area. All tools, equipment, fixtures, and the area in general must be maintained at a very high level of cleanliness. For air jets used in the area, compressed air from a source outside the area should be again filtered and dehydrated, even though the source has those facilities. All cloth used in these procedures must be lint-free and clean. Dry cleaning solvent Federal Spec P-S-661a must be filtered through clean chamois skin or filter paper before use, and periodically thereafter.

CAUTION

Permanent damage may result from forcibly spinning a bearing before it is thoroughly cleansed of all foreign matter. Bearings must not be handled with bare hands during and after cleaning and preservation. Operators must wear rubber gloves or finger stalls to avoid contamination of bearings by fingerprints. Handling should be kept to a minimum.

b. Insert a bearing holder into bore securely, and immerse bearing in a cleaning bath of dry cleaning solvent Federal Spec P-S-661a. Move bearing up and down several times to circulate the dry cleaning solvent.
c. Remove from bath, and direct air jet at side of bearing opposite from holder until dry; take care not to allow flow from air jet to spin the bearing.
d. Again wash and dry bearing as directed in steps b and c.
e. Repeat wash as directed under step b, and while so doing, gently rotate outer race with gloved fingers to dislodge any foreign particles from balls, retainer, and races; then dry as directed in step c.
f. Demagnetize the bearing by passing it through the throat of a suitable demagnetizer, once in a forward direction, then in the reverse direction; and, while so doing, slightly rotate the bearing in order that the balls within it will be rotated one or two revolutions.
g. Using a second bath of freshly filtered dry cleaning solvent, repeat washing and drying operations of step e. Repeat this operation until bearing is completely free of all foreign matter as ascertained by step h following.
h. Gently rotate outer race with gloved finger, and observe whether the action is smooth all the way around, without resistance or grinding. Smooth action of a dry bearing is accepted as an indication that it is clean.
i. Bake bearing for approximately one-half hour in suitable electric or infrared ventilated oven at approximately 43°C (110°F) until all remaining dry cleaning solvent is evaporated.
j. Remove from oven, place in clean, dry, suitable container for protection from dust, moisture, and handling while in transit to inspector. Attach to the container a slip identifying the contents, and forward immediately to inspection department.

CAUTION

Some inspection procedures require the cleaned bearings to be dry; that is, without lubrication. Because the dry bearings are unprotected from corrosion due to moisture, it is necessary that they be inspected immediately after cleaning.

5-26. BEARINGS, BALL: SEALED.
a. Remove the seals, if this can be done without damage, and clean the unsealed bearing as directed by paragraph 5-24.
b. If the seals cannot be removed without damage, it will be necessary to force the filtered dry cleaning solvent, Federal Spec P-S-661a, under pressure past seals and through the bearing, using equipment designed for this purpose. Observe CAUTIONS under paragraph 5-25.
c. When all lubricant, including hardened oxidized grease, has been washed away, the bearing is ready for drying. With suitable equipment force dry, clean air past seals and through bearing until it is thoroughly dry.
d. Prepare bearing for inspection purposes only by lightly lubricating with a few drops of refrigerating-machine lubricating oil Federal Spec VV-O-581, forced into bearing under pressure.
e. Immediately package the bearing in a container which will protect it from dust, moisture, and handling prior to inspection.

5-27. BEARINGS, BALL: SPECIAL.

5-28. Special ball bearings, such as those found on the stop-ring shaft assemblies of the Autotune positioning heads, are cleaned as follows:
a. Observing CAUTIONS and general cleaning instructions for ball bearings under paragraph 5-24, immerse bearing in a cleaning bath of dry cleaning solvent Fed. Spec P-S-661a. Move bearing up and down several times to circulate the dry cleaning solvent.
b. Remove from bath, and direct air jet at side of bearing until dry.
c. Again wash and dry bearing as directed in steps a and b.
d. Demagnetize bearing as directed in step f of paragraph 5-25.
e. Using freshly filtered dry cleaning solvent, repeat washing and drying operations until bearing is completely free of all foreign matter.
f. Bake and package bearing as directed in steps i and j of paragraph 5-25.

5-29. CABLE, COVERED.
a. Clean outer surface of flexible vinylite conduit, by wiping dirt from surfaces with solvent-moistened, lintless cloth.
b. Wipe dry, using dry, clean, lintless cloth.
c. Treat any connector terminations as directed in paragraph 5-34; wipe clean any lug terminations with solvent-moistened, lintless cloth, and dry them with dry, clean, lintless cloth.

5-30. CASTINGS.

5-31. Castings; unfinished, finished, or partly finished, are cleaned as follows:
a. Remove bulk of any surface grease with rags.
b. Blow dust from surfaces, holes, and recesses with air jet.
c. Immerse casting in washing bath of solvent, and scrub until clean, working over all surfaces and into all holes and recesses with suitable nonmetallic brushes. Flat, wood-backed brushes with soft fiber bristles are recommended for surfaces; round brushes similar to those used for washing bottles and test tubes are recommended for holes and recesses.
d. Raise from bath, and permit solvent to drain into bath.
e. Immerse in rinsing bath of clean solvent, rinse, and raise from bath. Position to drain dry, i.e., so that solvent is not trapped in holes or recesses. Where

practical positioning will not permit complete drainage, use air jet to remove any trapped solvent.
f. When thoroughly dry, touch up minor damage to finish. Extensive damage to finish may require complete refinishing.
g. Protect from dust and moisture, pending inspection.

5-32. CHASSIS, WIRED.

5-33. The following cleaning procedure is used for wired chassis containing terminal boards, resistor and capacitor assemblies and subassemblies, r-f coils, switches, tube sockets, inductors, transformers, relays, or other wired parts.
a. Remove dust and dirt from all surfaces, including parts and wiring, using soft-bristled brushes in conjunction with an air jet.

CAUTION

Avoid air-blasting small coils, leads, and other delicate parts by too close an approach with air jet nozzle. Use caution in use of brushes on delicate parts.

NOTE

When necessary to disturb the dress of wiring and cables, dressing should be noted, and upon completion of cleaning operations, wiring and cables should be restored to their proper positions or dress.

b. Clean jacks as instructed in paragraph 5-46.
c. Clean lamp holders as directed in paragraph 5-47.
d. With minimum possible disturbance of wiring, clean connectors as prescribed in paragraph 5-34.
e. Disturbing wiring as little as possible, clean tube sockets as directed in paragraph 5-62.
f. Clean relays according to paragraph 5-61, and with minimum disturbance of wiring.
g. Clean toggle and sensitive switches as directed in paragraph 5-64, rotary switches as instructed in paragraph 5-65, and concentric r-f switches as directed in paragraph 5-67. Disturb wiring dress as little as possible.
h. Clean ceramic or mycalex insulators by method prescribed in paragraph 5-44
i. Complete chassis cleaning by wiping down all finished surfaces with solvent-moistened, lintless cloth.
j. Dry and polish these surfaces, using dry, clean, lintless cloth.
k. Make touch-up repairs to minor damage to finish.
l. Protect from dust, moisture, and physical damage, pending inspection.

5-34. CONNECTORS.

NOTE

Connectors received for overhaul which contain Dow-Corning #4 sealing and insulating compound require steam cleaning in equipment designed for this purpose.

a. Wipe dust and dirt from bodies, shells, and cable clamps, using solvent-moistened, lintless cloth. Wipe dry with clean, dry, lintless cloth.
b. Remove dust from inserts, using small, soft-bristled brush in conjunction with air jet.
c. Wash dirt and any traces of lubricant from insert, insulation, and contacts with solvent applied sparingly with small camel's hair brush.

CAUTION

Do not allow solvent to run into sleeves (or conduit) covering any wires or cables connected to contact terminals of the insert.

d. Dry the insert with air jet.

5-35. COVERS AND SHIELDS.

5-36. Clean all unfinished, partly finished, and finished sheet metal covers and shields such as dust covers, inspection covers, chassis covers, and housings according to applicable steps of procedure used for cleaning castings. Refer to paragraph 5-30.

5-37. DIALS AND KNOBS.

5-38. Clean all dials and knobs by gently wiping their surfaces with clean, soft, lintless cloth which has been slightly moistened with solvent. When clean, polish with tissue paper.

5-39. FIELD ASSEMBLIES.

CAUTION

Do not allow field assembly to rest on its coils. Injury to windings or insulation may result.

a. Blow dust and dirt from all surfaces and crevices with air jet. Do not raise or tear loose any insulation with air jet.

WARNING

When using flammable materials for cleaning purposes, observe all fire precautions. These materials should only be used outside, or in a ventilated booth provided with explosion-proof electrical equipment and an exhaust fan having spark-proof blades.

b. If assembly is not very dirty, and there is no oil or grease present, finish cleaning by wiping over all surfaces, using lintless cloth moistened with an approved solution.
c. If assembly is very dirty, or with oil or grease present, immerse in washing bath of an approved

solution, and wash clean, using soft-bristled brush having no metallic parts; then remove and drain.
d. Immerse field assembly in rinse bath of an approved solution, rinse gently, remove immediately, and drain.
e. Rest on suitable metal screen in ventilated oven, and dry at 105°C (221°F) for four hours to evaporate solution and remove moisture.
f. Protect from dust and moisture, and rest field assembly on its side pending inspection.

5-40. GASKETS AND SEALS, NEOPRENE OR RUBBER.
a. Remove any grease from surfaces with dry, lintless cloth.
b. Make up a washing bath of 2 ounces of detergent powder (Dreft) per gallon of warm water.
c. Immerse gaskets and seals in bath, and wash clean with lintless cloth.
d. Rinse well in clean warm water, dry with air jet, and protect from dust, lubricants, and high temperatures, pending inspection.

5-41. GASKETS AND SHIM WASHERS, PAPER OR FIBER.
a. Remove any grease from surfaces with dry lintless cloth.
b. Quickly but thoroughly wipe all surfaces with clean, lintless cloth moistened with solvent until clean.
c. Immediately dry all surfaces using clean, dry, lintless cloth.
d. Protect from dust and lubricants pending inspection.

5-42. GEARS, METAL OR FABRIC.

5-43. Clean gears and gear assemblies according to procedure for cleaning machined metal parts, as directed in paragraph 5-51.

5-44. INSULATORS, CERAMIC OR MYCALEX.

5-45. Clean all terminal mounting insulators of glazed porcelain, ceramic insulators, or mycalex insulators as follows:
a. Wipe clean with solvent-moistened, clean, lintless cloth.
b. Dry and polish, using dry, clean, lintless cloth.

5-46. JACKS.
a. Remove dust from exteriors with camel's hair brush and air jet.
b. Blow dust from interior of single female contact with air jet.

5-47. LAMP HOLDERS.
a. Clean exteriors with soft-bristled brush and air jet.
b. Clean interiors of socket types with air jet.

5-48. LAMPS.

5-49. Clean all dial lamps by wiping with solvent-moistened, lintless cloth; then dry and polish with clean, dry, lintless cloth.

5-50. LENS, LAMP-HOLDER.
a. Wipe all surfaces clean with solvent-moistened, lintless cloth.
b. Wipe all surfaces dry with dry, clean, lintless cloth.
c. Polish glass lens with clean, fine, tissue paper or lens tissue paper.

5-51. MACHINED METAL PARTS.

5-52. Detached gears, shafts, keys, pins, collars, worms, springs, and similar machined parts, should be cleaned in a suitable machine, if available; otherwise proceed as follows:
a. Clean as directed in steps a, c, d, and e of paragraph 5-31, and in steps b, c, and d of this paragraph.

NOTE

Split-gear assemblies of spring-loaded type require cleaning between the twin gears. Accomplish this while washing, by moving gears with fingers.



To prevent corrosion, avoid touching any machined or unfinished surfaces with bare hands after cleaning.

b. Dry in dust-free, dry area or suitable enclosure. The use of radiant heat in a ventilated enclosure is recommended for drying, particularly wherever atmospheric humidity is high.
c. When dry, immediately apply light coat of MIL-L-7870 lubricating oil to any bare steel surfaces.
d. Protect from dust and moisture pending inspection.

5-53. MECHANICAL METAL PARTS.

5-54. The detached miscellaneous mechanical parts include ventilating grilles, mounting plates, mounting clamps and brackets, blower fan, nuts, bolts, screws, washers, handles, fasteners, and hardware. These are handled in a suitable cleaning machine, or according to applicable steps of procedure used for castings. Refer to paragraph 5-30.

5-55. MOLDED PLASTIC PARTS.

5-56. Plastic parts in this equipment include dust caps, or covers, insulating members, terminal boards, and mounting blocks. These are cleaned in the following manner:
a. With air jet, blow loose dust and dirt from surfaces, holes, and crevices, including any attached metal parts.
b. Wipe clean, using solvent-moistened, lintless cloth.
c. Dry and polish, using clean, dry, lintless cloth.

5-57. MOUNTS, VIBRATION: HOLDER TYPE.

5-58. Clean detached mounts as follows:
a. Blow dust from surfaces with air jet.
b. Wipe clean of any grease or remaining dirt, using solvent-moistened, lintless cloth.
c. Make up washing bath by dissolving two ounces of detergent powder (Dreft) per gallon of warm water, immerse mounts, and agitate them in bath a few minutes. Raise and drain.
d. Rinse mounts in warm-water bath, drain, and dry with air jet.

5-59. RECEPTACLES.

5-60. Clean all receptacles according to applicable steps of procedure used for connectors. Refer to paragraph 5-34.

5-61. RELAYS.

a. Clean dirty (not pitted or burned) contacts, using burnishing tool (ASO Stock No. R41-T-3080). Before using tool, clean its burnishing surface with alcohol. Do not allow fingers to touch this surface after cleaning, or prior to use.

CAUTION

Contacts supporting members should not be bent or forced beyond their normal operating limits while burnishing contacts.

b. Remove dust and dirt by careful use of air jet and soft-bristled brush. Direct air jet onto contacts, operating the relay armature with fingers while blowing, so that dust will be blown from contact surfaces as they open and close.

c. Wash all surfaces of all contacts with trichloroethylene (AN-O-T-631) applied with clean camel's hair brush.

d. Dry contacts with air jet, then remove any whitish film residue by passing small strips of clean white writing paper back and forth between each pair of contacts while holding them with light finger pressure in their closed position.

5-62. SOCKETS, TUBE.

5-63. Mica-filled bakelite sockets are cleaned as follows:

a. Remove any rosin adhering to silver-plated contacts, using orange sticks dressed to wedge ends.

CAUTION

Do not use metal tools to remove foreign matter from these contacts, as damage to contact plating invites corrosion which may ultimately result in equipment failure. Existing corrosion on contacts should not be disturbed. Its presence will indicate positive damage of plating to inspection, and necessity for socket replacement.

b. Wash contacts with solvent lightly applied with small soft-bristled brush.

c. Using solvent-moistened, lintless cloth, remove any foreign matter adhering to socket body or wafer.

d. Dry all parts with air jet.

5-64. SWITCHES, SENSITIVE OR TOGGLE.

a. Using air jet, blow dust from surfaces and crevices of switch bodies, and any attached activating mechanisms.

b. Wipe all surfaces with solvent-moistened, lintless cloth, and dry with air jet.

5-65. SWITCHES, ROTARY.

5-66. Clean all special switches with button contacts and switches of the phenolic-wafer type as follows:

a. Remove all dust with air jet, turning switch rotor back and forth several times while blowing.

b. Wash all contacts and insulation with solvent lightly applied with small camel's hair brush.

c. Dry with air jet, then repeat wash, using clean solvent, and rotating switch rotor several times during this wash.

d. Dry gently but thoroughly with air jet.

5-67. SWITCHES, CONCENTRIC R-F.

5-68. Clean all concentric r-f switches used in the band switching circuits of Receiver-Transmitter RT-178/ARC-27 as follows:

a. Carefully remove dust with air jet, gently turning switch rotor while blowing.

b. Carefully wash movable and stationary contacts only with solvent lightly applied with small brush.

c. Dry carefully with air jet, taking care not to blow any traces of solvent into switch bearings.

d. Rinse carefully all movable and stationary contacts by applying aliphatic petroleum naphtha (Spec TT-N-95-1) sparingly with small brush.

e. Dry gently but thoroughly with air jet.

5-69. TUBES, ELECTRON.

a. Remove dust and dirt from surface of glass or metal envelope and side of tube base with solvent-moistened, lintless cloth lightly applied to avoid obliterating type markings or loosening tube-cap terminals.

b. Dry and polish these surfaces by gently wiping them with dry, clean, lintless cloth.

c. Clean bottom of base and all tube contacts with soft-bristled brush.

NOTE

Abrasives or metal tools should not be used to remove corrosion deposits occasionally present on tube contacts. These deposits are indicative of damage to contact plating, and inspection will probably order tube replacement.

d. Protect from dust and breakage pending inspection.

SECTION VI
INSPECTION

6-1. INTRODUCTION.

6-2. This section presents instructions and directive procedures designed to determine, by inspection, the condition of the dismantled, disassembled, and cleaned components, subassemblies, assemblies, and parts of Radio Sets AN/ARC-27 and AN/ARC-27A. Defects resulting from wear, physical damage, deterioration, or other such causes are brought to light by these inspection procedures.

6-3. To facilitate inspection, component inspection instructions are alphabetically arranged under paragraph 6-4. Detailed inspection procedures are alphabetically arranged under paragraph 6-14 or 6-38, depending upon whether the nature of the part involved is mechanical or electrical and electronic. Wherever feasible inspection procedures are listed in tabular form. Table XIX contains information which is useful for comparative purposes when inspecting the gears.

6-4. COMPONENTS.

6-5. The following paragraphs contain instructions for inspecting the various parts of this equipment. Inspection instructions are listed for each component in tabular form, and opposite each part to be inspected, reference is made to the proper procedure.

6-6. AN/ARC-27 REMOTE RADIO SET CONTROL UNITS. Inspect dismantled Radio Set Control Units C-628/ARC-27, C-628A/ARC-27, C-627/ARC-27, C-911/ARC-27, C-868/ARC-27, C-905/ARC-27, C-906/ARC-27, C-912/ARC-27, C-853/ARC-27, C-913/ARC-27, or C-914/ARC-27 as directed in Table XIII.

TABLE XIII. INSPECTING AN/ARC-27 RADIO SET CONTROL UNITS

Item	Paragraph
MECHANICAL PARTS	
Cover	6-24
Knobs	6-26
Mechanical metal parts	6-35
ELECTRICAL PARTS	
Receptacle	6-67
Variable resistors	6-74
Soldered terminal connections	6-78
Rotary switches	6-81
Wiring	6-88

6-7. AN/ARC-27A REMOTE RADIO SET CONTROL UNITS. Inspect Radio Set Control Units C-1015/ARC-27A, C-1024/ARC-27A, and C-1025/ARC-27A as directed in Table XIV. These control units are not normally disassembled as part of the overhaul procedure, because of their complexity, but all parts to be inspected are accessible by removing the dust covers.

TABLE XIV. INSPECTING AN/ARC-27A RADIO SET CONTROL UNITS

Item	Paragraph
MECHANICAL PARTS	
Cover	6-24
Knobs	6-26
Mechanical metal parts	6-35
ELECTRICAL PARTS	
Receptacle	6-67
Variable resistors	6-74
Soldered terminal connections	6-78
Rotary switches	6-81
Wiring	6-88

6-8. RECEIVER-TRANSMITTER RT-178/ARC-27. Inspect the dismantled and disassembled Receiver-Transmitter RT-178/ARC-27 as directed in Table XV.

TABLE XV. INSPECTING RECEIVER-TRANSMITTER RT-178/ARC-27

Item	Paragraph
MECHANICAL PARTS	
Castings	6-22
Covers and shields	6-24
Dials and knobs	6-26
Neoprene or rubber gaskets and seals	6-28
Metal or fiber gears	6-32
Machined metal parts	6-34
Mechanical metal parts	6-35
ELECTRICAL AND ELECTRONIC PARTS	
Covered cable	6-46
Fixed capacitors	6-48
R-F coils	6-50
Connectors	6-52
Ceramic or mycalex insulators	6-55
Jacks	6-57
Molded plastic parts	6-65
Receptacles	6-67
Relays	6-69

TABLE XV. INSPECTING RECEIVER-TRANSMITTER RT-178/ARC-27 (Cont.)

Item	Paragraph
ELECTRICAL AND ELECTRONIC PARTS	
Fixed composition resistors	6-70
Fixed wire-wound resistors	6-72
Variable resistors	6-74
Tube sockets	6-76
Soldered terminal connections	6-78
Concentric r-f switches	6-79
Rotary switches	6-81
Sensitive switch	6-82
Toggle switches	6-83
Transformers and reactors	6-85
Electron tubes	6-87
Wiring	6-88

6-9. DYNAMOTOR. Inspect the disassembled dynamotor as directed in Table XVI.

TABLE XVI. INSPECTING DYNAMOTOR

Item	Paragraph
MECHANICAL PARTS	
Bearings	6-18
Castings	6-22
Covers	6-24
Gaskets and shim washers	6-30
Mechanical metal parts	6-35
ELECTRICAL PARTS	
Armature	6-39
Capacitors	6-48
Field Assembly	6-53
Receptacle	6-67
Soldered terminal connections	6-78
Wiring	6-88

6-10. MOUNTING MT-822/ARC-27. Inspect Mounting MT-822/ARC-27 as directed in Table XVII.

TABLE XVII. INSPECTING MOUNTING MT-822/ARC-27

Item	Paragraph
MECHANICAL PARTS	
Mechanical metal parts	6-35
Vibration mounts	6-37

6-11. MOUNTINGS MT-821/ARC-27, MT-4/ARR-2, MT-1075/ARC-27. Inspect the radio set control mounting plates as directed in paragraph 6-35.

6-12. RADIO SET CONTROL C-626/ARC-27.

6-13. AUTOTUNE CONTROL HEAD. The Autotune control heads normally remain assembled during regular overhaul activities. However, it was recommended in Section V that the ball bearings on the stop-ring shaft assemblies of these heads be removed for cleaning purposes. Inspect these removed bearings as directed under paragraph 6-18. Also check the entire positioning head for signs of corrosion, rust, wear, physical damage, looseness of parts, and other abnormal conditions.

6-14. If the heads were disassembled as directed in Section III because of excessive dirt, wear, or other interference, inspect the various parts in accordance with applicable procedures found in this section before they are reassembled.

6-15. MECHANICAL DRIVE SUBASSEMBLY. Inspect the assembled Mechanical Drive Subassembly as directed in Table XVIII.

TABLE XVIII. INSPECTING MECHANICAL DRIVE SUBASSEMBLY

Item	Paragraph
MECHANICAL PARTS	
Castings	6-22
Covers and shields	6-24
Metal or fiber gears	6-32
Machined metal parts	6-34
Mechanical metal parts	6-35
ELECTRICAL AND ELECTRONIC PARTS	
Covered cable	6-46
Connectors	6-52
Ceramic or mycalex insulators	6-55
Molded plastic parts	6-65
Relays	6-69
Soldered terminal connections	6-78
Rotary switches	6-81
Wiring	6-88

6-16. If the Mechanical Drive Subassembly has been disassembled in accordance with procedures in Section III, all gears should be thoroughly cleaned, inspected, and lubricated before reassembly. Where limited access does not permit the procedures in Table XVIII to be followed, the Mechanical Drive Subassembly should be visually inspected to determine if disassembly is necessary. Do not disassemble the subassembly as a routine overhaul procedure.

6-17. MECHANICAL PARTS.

6-18. BEARINGS, BALL.

6-19. GENERAL. The following inspection procedure applies to all ball bearings of the open, sealed, or special types found in this equipment. After the bearing has been cleaned, it is inspected to determine whether it is serviceable, or is to be rejected because of a defect. It is recommended that defective bearings in this equipment be replaced with new bearings rather than to recondition or replace defective parts. If determined serviceable, the bearing is again cleaned.

After final cleaning it is either properly lubricated for installation or treated with preservative for storage, as required; depending upon its destination, it is then suitably wrapped and packaged. Whether the bearing is to be used immediately or stored, its packaging must be clearly marked on the outside with proper nomenclature to fully identify contained bearing and its lubrication or preservative material.

CAUTION

All inspection work must be performed under conditions of extreme cleanliness. Operators must wear rubber gloves or finger stalls to prevent corrosion due to fingerprint contamination when handling bearings.

6-20. INSPECTION. Inspect all bearings as outlined below:

a. Check for blue or purple discoloration of any part of bearing due to burning.

b. Check for tarnished external surfaces. This is indicated by a light discoloration of the highly finished surfaces.

c. Check for rust.

d. With emphasis on bearing balls and races, check for pitted, scarred, scuffed, or galled surfaces.

e. Check for flat bearing balls, broken ball separators, flaking or spalling of load carrying surfaces, and all other abnormal conditions.

6-21. In addition to the above inspection, check for undersize OD caused by creepage of outer race in its housing. This applies to all ball bearings whose races do not separate when the bearing is removed from its companion part, such as the special bearings located on the stop-ring shaft assembly of each positioning head. Also check for oversize or defective bore cuased by the inner race having turned on its shaft, and for excessive radial play. Use a suitable radial gauge equipped with a dial indicator calibrated in ten-thousandths of an inch when checking radial play of each bearing, which must previously have been cleaned and dried. A noise inspection of this type of bearing can be accomplished by manual or mechanical rotation. If motor driven, the bearing should be lightly lubricated with oil only, such as Federal Spec VV-O-581, and rotated at 500 to 1000 rpm. A dental lathe can be used to drive the inner race while the outer race is held in gloved fingers. A used but serviceable bearing will develop a certain amount of noise. A slight, uniform noise is to be expected, but loud noise, nonuniform noises such as clicks or buzzes, and vibration originating in the bearing indicate that it is unfit for service. If manually rotated, the bearing must be clean and dry (unlubricated), and the outer race should be spun with the gloved finger while the bearing is held by means of a bearing holder inserted in its bore. Hold the bearing in several positions while making the check, and listen for any vibration or intermittent resistance.

6-22. CASTINGS.

6-23. Unfinished, finished, or partly finished castings are inspected as follows: Inspect for cracks or breaks and marred or damaged machined surfaces, holes, counterbores, or threads. Also determine whether finish, is damaged beyond practical touch-up repairs, requiring work in finishing department.

6-24. COVERS AND SHIELDS.

6-25. Inspect covers and shields for deformation, punctures, deep dents, and badly worn surfaces. Also check for damaged fastener devices or handles. Examine them for corrosion and damage to finish requiring work in finishing department.

6-26. DIALS AND KNOBS.

6-27. Inspect all dials and knobs for physical damage and deformation, marred surfaces, and impairment of markings.

6-28. GASKETS AND SEALS, NEOPRENE OR RUBBER.

6-29. Inspect these gaskets and seals for deformation, and for damage such as tears, creases, folds or elongation, rough surfaces, and imbedded foreign matter. Check for loss of resiliency by stretching or compressing moderately and noting any failure to spring back to shape.

6-30. GASKETS AND SHIM WASHERS, PAPER OR FIBER.

6-31. Inspect these gaskets and shim washers for deformation, and for damage such as tears, rough surfaces, imbedded foreign matter, and other abnormal conditions.

6-32. GEARS, METAL OR FIBER.

6-33. Gears in this equipment, except the ones contained in the Autotune control and positioning heads, are identified in Table XIX. This table lists basic dimensions of these gears in inches, the number of teeth, the diametral pitch, the type, and the material from which the gear is cut. Gear plating, if any, is also given in order to make possible quick identification of the gear involved. Inspect these gears as follows:

NOTE

Wear of gear bore and teeth, except in instances where it is sufficiently severe to be apparent on visual inspection is best determined by gauge measurement. Bore wear can be ascertained by comparing plug-gauged diameter with diameter given for a new gear in Table XIX. Presence of a sharp burr on one side of gear at edges of teeth is an indication of wear of teeth.

a. Inspect all gears for broken, chipped, or badly worn teeth.

b. Inspect gear bodies for cracks and deformation.

c. Inspect bore of gear for excessive wear.

d. Inspect surfaces for corrosion or other abnormal condition.

TABLE XIX. GEAR DATA

Gear	Type	No. of Teeth	Diametral Pitch	OD (in.)	Bore or Shaft (in.)	Face Width (in.)	Material	Figure
O-102	spur	48	48	1-1/32	bore 0.250	0.095	Aluminum	6-1
O-104	spur	48	48	1.031	bore 0.250	0.093	Aluminum	6-1
O-106	spur	48	48	1-3/64	bore 0.250	0.095	Aluminum	6-1
O-107	spur	48	48	1.031	bore 0.250	0.093	Aluminum	6-1
O-109	spur	48	48	1-3/64	bore 0.250	0.095	Aluminum	6-1
O-206	spur	54	48	1-3/16	bore 0.1895	0.041	Brass	6-2
O-204	spur	60	48	1.280	bore 0.750	0.093	Brass	6-2
O-205	spur	60	48	1-9/32	bore 0.438	3/32	Brass	6-2
O-203	spur	60	48	1-5/16	bore 0.438	0.095	Brass	6-2
O-501	spur	48	48	1-3/64	bore 0.250	0.095	Aluminum	6-3
O-503	spur	48	48	1.031	bore 0.250	0.093	Aluminum	6-3
O-504	spur	48	48	1-3/64	bore 0.250	0.095	Aluminum	6-3
O-506	spur	48	48	1.031	bore 0.250	0.093	Aluminum	6-3
O-507	spur	48	48	1-1/32	bore 0.250	0.095	Aluminum	6-3
O-510	spur	48	48	1-3/64	bore 0.250	0.095	Aluminum	6-3
O-512	spur	48	48	1.031	bore 0.250	0.093	Aluminum	6-3
O-513	spur	48	48	1-1/32	bore 0.250	0.095	Aluminum	6-3
O-516	spur	48	48	1.031	bore 0.250	0.093	Aluminum	6-3
O-517	spur	48	48	1-3/64	bore 0.250	0.095	Aluminum	6-3
O-601	spur	60	48	1-9/32	bore 0.250	0.093	Aluminum	6-4
O-602	spur	48	48	1.031	bore 0.250	0.093	Aluminum	6-4
O-603	spur	60	48	1-9/64	bore 0.3755	0.095	Aluminum	6-4
O-604	spur	60	48	1-11/32	bore 0.438	0.128	Aluminum	6-4
O-606	spur	60	48	1-9/32	bore 0.250	0.093	Aluminum	6-4
O-607	spur	60	48	1-9/32	bore 0.3755	0.095	Aluminum	6-4
O-609	spur	60	48	1-9/32	bore 0.250	0.093	Aluminum	6-4
O-610	spur	60	48	1-9/32	bore 0.3755	0.095	Aluminum	6-4
O-1201A	spur	72	48	1.650	bore 0.251	0.091	Phosphor Bronze	3-7
O-1217	spur spur	40 30	48 48	0.895 0.640	bore 0.250 bore 0.250	0.070 0.077	Phosphor Bronze	3-7
O-1216	spur	45	48	31/32	bore 0.250	0.090	Brass	3-7

TABLE XIX. GEAR DATA (Cont.)

Gear	Type	No. of Teeth	Diametral Pitch	OD (in.)	Bore or Shaft (in.)	Face Width (in.)	Material	Figure
O-1211	spur	109	48	2-11/32	bore 0.250	0.100	Aluminum	3-7
O-1245	spur	45	48	1.000	bore 0.250	0.100	Aluminum	3-7
O-1262	spur	90	48	1-19/32	bore 0.249	0.100	Aluminum	3-7
O-1228	spur spur	54 18	48 48	1-5/32 0.4375	bore 0.1880 bore 0.1880	0.095 0.130	Brass Phosphor Bronze	3-7 3-7
O-1229	spur	36	48	0.780	bore 0.156	0.135	Stainless Steel	3-7
O-1218A	spur spur	60 48	48 48	1.2968 0.7968	bore 0.437 bore 0.437	0.0650 0.070	Stainless Steel	3-7 3-7
O-1218C	spur	18	48	0.385	bore 0.1246	0.194	Stainless Steel	3-7
O-1218D	spur	18	48	0.385	bore 0.1246	0.194	Stainless Steel	3-7
O-1218E	spur	18	48	0.385	bore 0.1246	0.194	Stainless Steel	3-7
O-1218F	spur	18	48	0.385	bore 0.1246	0.194	Stainless Steel	3-7
O-1218G	spur	36	48	0.7968	bore 0.421	0.0625	Stainless Steel	3-7
O-1213	spur	60	48	1-5/16	bore 0.2505	0.100	Aluminum	3-7
O-1214	spur	57	48	1-13/64	bore 0.2505	0.100	Aluminum	3-7
O-1215	spur	78	48	1-21/32	bore 0.2505	0.100	Aluminum	3-7
O-1244	spur	90	48	1-29/32	bore 0.1880	0.100	Aluminum	3-7
O-1242	spur	79	48	1-21/32	bore 0.1878	0.095	Aluminum	3-7
O-1263	spur	66	48	1.3850	bore 0.1878	0.100	Aluminum	3-7
O-1202	spur	72	48	1.650	bore 0.251	0.091	Aluminum	3-7
O-1238C	spur	54	48	1.150	bore 0.1878	0.155	Brass	3-7
O-1237	spur	48	48	1-3/64	bore 0.1567	0.093	Brass	3-7
O-1203	spur	72	48	1.650	bore 0.251	0.091	Aluminum	3-7
O-1270	spur	16	48	0.350	bore 0.1880	0.100	Stainless Steel	3-7
O-1225	spur pinion	74 16	48 48	1.590 0.375	bore 0.2817 shaft 0.2817	0.095 0.255	Brass Stainless Steel	3-7 3-7
O-1226	spur pinion	80 16	48 48	1.718 0.3828	bore 0.2817 shaft 0.2817	0.095 0.255	Brass Stainless Steel	3-7 3-7

TABLE XIX. GEAR DATA (Cont.)

Gear	Type	No. of Teeth	Diametral Pitch	OD (in.)	Bore or Shaft (in.)	Face Width (in.)	Material	Figure
O-1227	spur	45	48	1.000	bore 0.1880	0.230	Phosphor Bronze	3-7
O-1688	spur	15	48	0.374	bore 0.052	0.156	Stainless Steel	3-8
O-1618	spur	50	48	1.0780	bore 0.1255	0.093	Linen Base Bakelite	3-8
	pinion	16	48	0.375	bore 0.1255	0.187	Phosphor Bronze	3-8
O-1618	spur	53	48	1.1224	bore 0.1255	0.093	Linen Base Phenolic	3-8
	pinion	16	48	0.375	bore 0.1255	0.187	Phosphor Bronze	3-8
O-1607	spur	49	48	1-1/16	bore 0.1880	0.093	Bakelite	3-8
O-1684	spur pinion	16	48	0.375	shaft 0.187	0.187	Stainless Steel	3-8
O-1685	spur	60	48	1-5/16	bore 0.1880	0.062	Yellow Brass	3-8
	pinion	28	48	21/32	bore 0.1880	0.1718	Phosphor Bronze	3-8
O-1682	spur	56	48	1-7/32	bore 0.192	0.090	Brass	3-8
O-1689	spur	24	48	9/16	bore 0.188	0.093	Stainless Steel	3-8
O-1602	spur	72	48	1.650	bore 0.251	0.091	Phosphor Bronze	3-8
O-1686	spur	54	48	1-11/64	bore 3/32	0.093	Brass	3-8
O-1683	spur	54	48	1.1562	bore 0.313	0.093	Brass	3-8
O-1601A	spur	72	48	1.650	bore 0.251	0.091	Phosphor Bronze	3-8
O-1687	spur	33	48	3/4	bore 0.1875	0.093	Brass	3-8
O-1680	spur	48	48	1.0468	bore 0.2508	0.093	Brass	3-8
	spur	90	48	1.9375	bore 0.500	0.005	Brass	3-8
O-1672	spur	56	48	1-7/32	bore 0.250	0.062	Brass	3-8
O-1675	spur	72	48	1-19/32	bore 0.2505	0.093	Phosphor Bronze	3-8
O-1698	spur	72	48	1-19/32	bore 0.2505	0.093	Phosphor Bronze	3-8
O-1676	spur	69	48	1-15/32	bore 0.250	0.095	Bronze	3-8

6-34. MACHINED METAL PARTS.

a. Make overall check for physical damage to surfaces, corners, and edges.

b. Inspect closely all machined plane surfaces, holes, bores, counterbores, slots, grooves, shoulders, flanges, keyways, teeth, tapped holes and all threaded members, both male and female, for physical damage of any sort, including roughness of surface, corrosion, or presence of foreign matter.

c. Inspect plated or finished areas for damage requiring replating or refinishing beyond touch-up repair.

6-35. MECHANICAL METAL PARTS.

6-36. Inspect the unmachined mechanical metal parts including ventilating grilles, mounting plates, chassis, mounting clamps and brackets, blower fans, nuts, bolts, screws, washers, handles, fasteners, and hardware for physical damage and deformation. Also check these parts for corrosion and any damage which would require replating or refinishing beyond practical touch-up.

6-37. MOUNTS, VIBRATION: HOLDER TYPE.

a. Inspect metal parts for corrosion, damaged surface, and deformation.

b. Inspect the elastic members for deep cracks or other physical damage.

c. Inspect elastic members for loss of resiliency by distorting manually and noting return to normal position upon release. Sluggish return or failure to return completely to normal position indicates a defective mount.

6-38. ELECTRICAL AND ELECTRONIC PARTS.

6-39. ARMATURES, MOTOR OR DYNAMOTOR.

6-40. Inspect these armatures for defects listed in Table XX.

TABLE XX. INSPECTION OF MOTOR AND DYNAMOTOR ARMATURES

Defect	Shaft	Laminations	Bands	Windings	Insulation	Commutator	Notes
Corrosion (rust)	X	X	X				1. With Dynamotor armature centered in lathe, measure cut required. If cut will leave less than minimum diameter indicated in Table XXIV, replace armature.
Corrosion (verdigris)				X		X	
Roughness, grooving or pitting						X	2. Cause for replacement. Refer to Table XXIV.
Out of round (note 1)						X	3. Determine by growler test, or by continuity test.
Burning						X	4. Megger test.
Loss of solder						X	5. Burning on commutator is an indication. Check by performing a growler test.
High mica						X	6. Use the baking megger test. Condition is usually due to moisture, but is sometimes due to charred insulation under coils.
Worn to minimum diameter (note 2)						X	
Physical damage	X	X	X	X	X	X	
Looseness			X	X	X	X	
Open coils (note 3)				X			

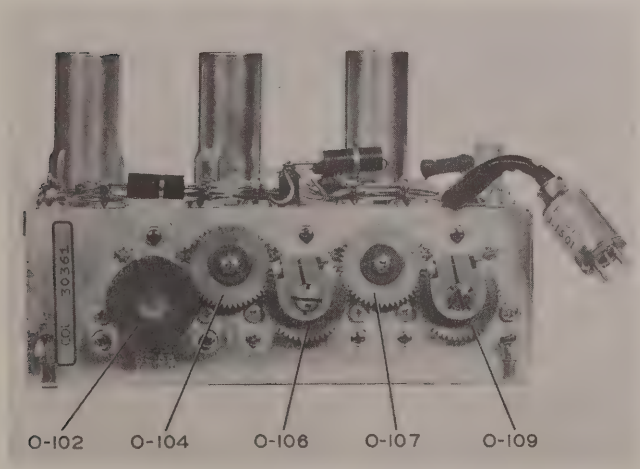


Figure 6-1. Main Receiver R-F Amplifier Subassembly, Right Side View

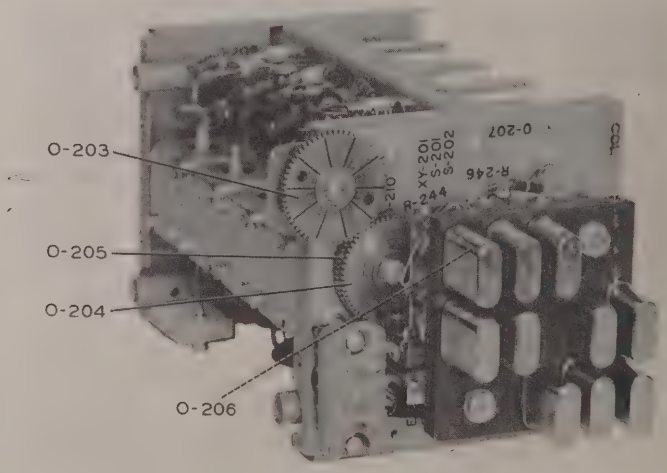


Figure 6-2. 20-30 MC Variable I-F Amplifier Subassembly, Front View

TABLE XX. INSPECTION OF MOTOR AND DYNAMOTOR ARMATURES (Cont.)

Defect	Shaft	Laminations	Bands	Windings	Insulation	Commutator	Notes
Grounded coils (note 4)				X			
Shorted coils (note 5)				X			
Low insulation resistance (note 6)					X		

6-41. AUTOTUNE CONTROL HEAD.

6-42. Because of its complexity, this control head ordinarily remains assembled during regular overhaul activities. Inspect it for corrosion, wear, physical damage, rust, and other abnormal conditions. Make certain that all movable parts are free, then proceed as follows:

a. Inspect the relays as directed under paragraph 6-69.

b. Inspect the rotary switch as directed under paragraph 6-81.

c. Inspect all remaining electrical contacts for signs of dirt, burning, pitting, and corrosion.

6-43. If this control head was disassembled as directed in Section III because of excessive dirt, wear, or mechanical difficulties, inspect the various parts in accordance with applicable procedures found in this section before reassembling.

6-44. AUTOTUNE MOTOR B-1601.

6-45. Although the Autotune motor is primarily an electrical device, it contains parts which are considered mechanical in nature. Inspect the electrical and mechanical parts of this motor as directed in Table XXI.

TABLE XXI. INSPECTING AUTOTUNE MOTOR B-1601

Item	Paragraph
MECHANICAL PARTS	
Bearings	6-18
Castings	6-22
Cover	6-24
Pinion	6-32
Mechanical metal parts	6-35
ELECTRICAL PARTS	
Armature	6-39
Capacitors	6-48
Field assembly	6-53
Wiring	6-88

6-46. CABLE, COVERED.

6-47. Inspect flexible vinylite conduit as follows:

a. Inspect for physical damage throughout entire length of conduit.

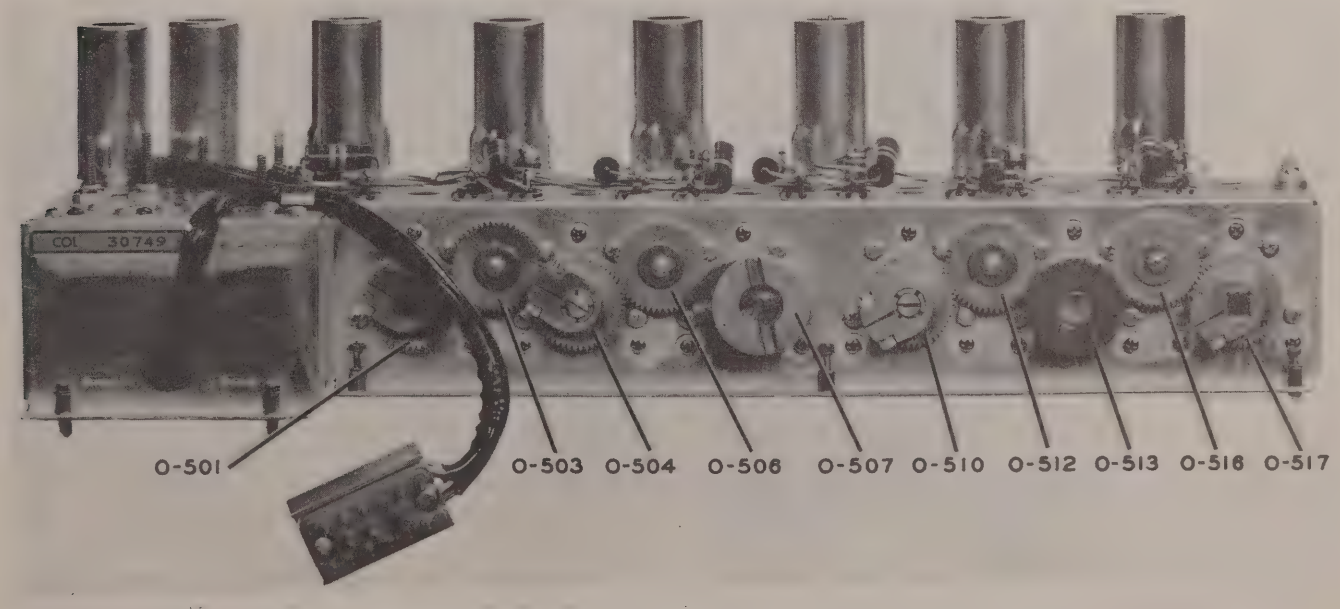


Figure 6-3. Spectrum Amplifier Subassembly, Left Side View

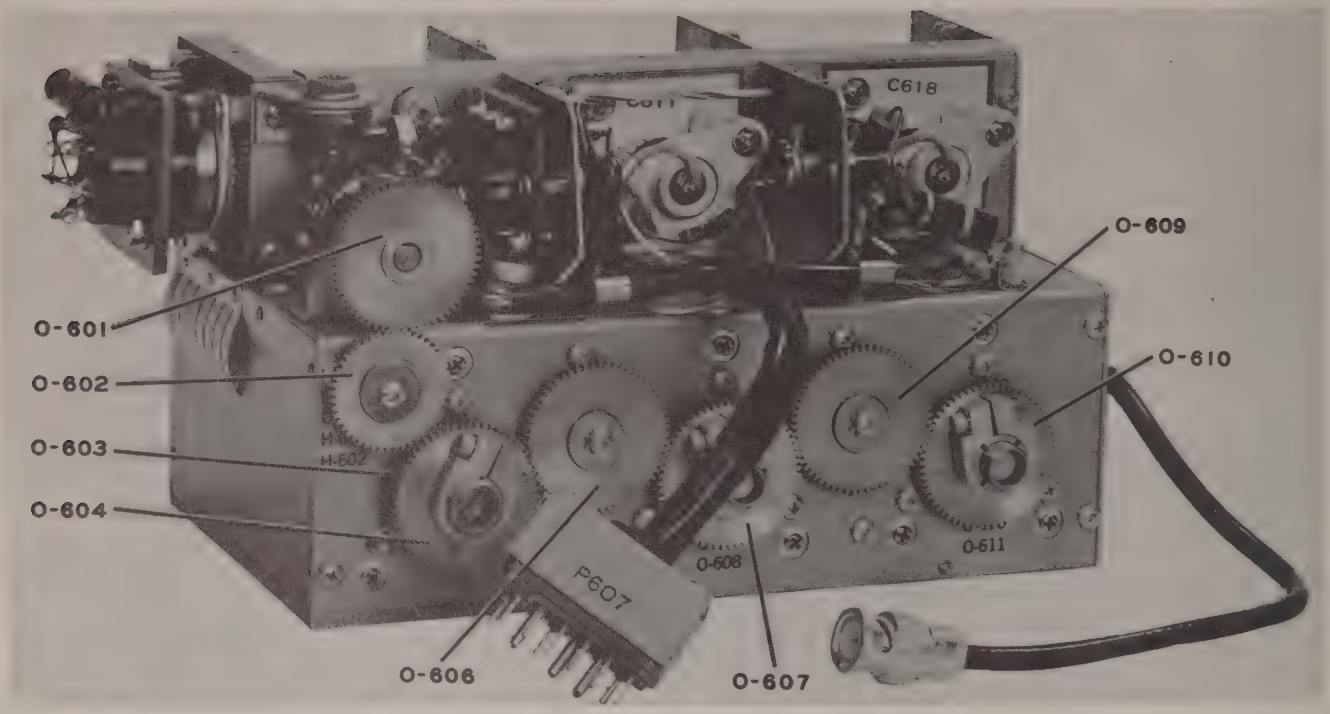


Figure 6-4. R-F Power Amplifier Subassembly, Left Side View

b. Inspect conduit at ends to make certain that it is not pulled loose from connectors.

c. Inspect cable for other abnormal conditions. Treat any connector terminations as directed under paragraph 6-52.

6-48. CAPACITORS, FIXED.

6-49. Inspect these capacitors for defects listed in Table XXII.

TABLE XXII. INSPECTION OF FIXED CAPACITORS

Defect	Metal Case	Molded Type	Ceramic Type
Oil leakage (at case seams or around terminal insulation)	X		
Cracked, broken, or charred terminal insulation	X		
Case damage (dents or holes)	X		
Case damage (cracks or breakage)		X	
Body damage (cracks or breakage)			X
Loose, broken or corroded terminal studs, lugs, or leads	X	X	X

TABLE XXII. INSPECTION OF FIXED CAPACITORS (Cont.)

Defect	Metal Case	Molded Type	Ceramic Type
Loose, broken, or poorly soldered terminal connections	X	X	X
Loose mountings	X	X	X

6-50. COILS, R-F.

6-51. Inspect r-f coils for broken leads, loose, poorly soldered, or broken terminal connections, and loose mountings. Also check for crushed, scratched, cut, bruised, or charred windings, for corrosion on windings, leads, terminals, and connections, and for physical damage to forms and tuning-slug adjustment screws.

6-52. CONNECTORS.

a. Inspect connector body for broken parts, deformed shell, clamp, and other abnormal conditions, depending upon its type.

b. Inspect connector for cracked, broken insulation, and for contacts which are broken, deformed, or out of alignment. Check also for corroded or damaged plating on contacts, and for loose, poorly soldered, broken, or corroded terminal connections.

6-53. FIELD ASSEMBLIES.

6-54. Inspect field assemblies for defects noted in Table XXIII.

TABLE XXIII. INSPECTION OF FIELD ASSEMBLIES

Defect	Frame	Laminations	Windings	Insulation	Leads	Notes
Corrosion (rust)	X	X				1. Use conventional continuity test to detect.
Corrosion (verdigris)			X		X	2. Use megger test.
Looseness		X	X	X	X	3. Use oven baking megger test (if time element is vital, a high-pot test of 500V, d-c, applied for one minute, may be used).
Burnt, charred, worn, or brittle condition				X		
Physical damage	X	X	X	X	X	
Open coils (note 1)			X			
Grounded coils (note 2)			X			
Low insulation resistance (note 3)			X			

6-55. INSULATORS, CERAMIC OR MYCALEX.

6-56. Inspect these insulators for cracked, chipped, or broken ceramic or mycalex. Also check for signs of burning, looseness, and other abnormal conditions.

6-57. JACKS.

6-58. Inspect all jacks for corrosion, rust, loose, or broken parts, cracked insulation, poor contacts, and other abnormal conditions.

6-59. LAMPS.

6-60. Inspect lamps for loose, cracked, or broken glass envelope. Also check for internal darkening, corrosion of base, and damage to insulation or base.

6-61. LAMP HOLDERS.

6-62. Inspect the lamp holders for corrosion, weak contacts, damaged insulation, and loose or broken parts. Also check for other conditions which are not normal.

6-63. LENS, LAMP-HOLDER.

6-64. Inspect the red lamp-holder lenses for cracks, looseness, deformation, and loss of color.

6-65. MOLDED PLASTIC PARTS.

6-66. Inspect these plastic parts, such as terminal boards, mounting blocks, and insulating members for signs of corrosion, cracked, broken or charred insulation, and for loose or missing mounting hardware. Also check these parts for other abnormal indications which might be a source of future breakdown.

6-67. RECEPTACLES.

6-68. Inspect receptacles for cracked, broken, or charred insulation. Also check for physical damage to all parts, loose or bent contacts, damage to contact plating, corrosion, and other abnormal conditions.

6-69. RELAYS.

a. Inspect relay contacts for burned or pitted areas, welds, misalignment, and improper separation.

b. Check contact support members for deformation causing contact misalignment or improper contact operation.

c. With the finger, test movable contacts for sluggish action or sticking at any point of travel in either direction. Examine for physical damage to armature. Also check for foreign matter between end of pole piece and armature.

d. Inspect for loose coil, corrosion, loose leads or terminals, and for cuts and damage to coil.

e. Inspect for loose, broken, brittle, or charred insulation on coil or leads, between contact-support members, and between terminals on relay.

f. Inspect for bent, loose, or broken terminals.

g. Check relay mountings and mechanical parts for looseness and physical damage or corrosion.

6-70. RESISTORS, FIXED COMPOSITION.

6-71. Inspect these resistors for cracked, broken, blistered, or charred bodies, and loose, broken, poorly soldered, or corroded terminal connections.

6-72. RESISTORS, FIXED: WIRE-WOUND.

6-73. Inspect these resistors for signs of heating, cracked, broken, or charred insulation, loose, poorly soldered, broken, or corroded terminal connections, and loose mountings.

6-74. RESISTORS, VARIABLE.

6-75. Inspect variable resistors for corrosion of shafts, cases, and other visible parts, loose mountings, and physical damage. Rotate the shaft to determine whether action is too rough, too loose, or too tight.

6-76. SOCKETS, TUBE.

6-77. Mica-filled bakelite sockets are inspected as follows:

a. Inspect for loose, broken, missing, or improperly seated mounting rings. Also check for cracked, broken, or charred insulation.
b. Inspect for broken, deformed, or corroded contacts, and loose, poorly soldered, broken, or corroded terminal connections.

6-78. SOLDERED TERMINAL CONNECTIONS.
a. Inspect for cold-soldered or "rosin" joints. These joints present a porous or dull, rough appearance. Check for strength of bond with the point of a tool.
b. Examine for excess solder, protrusions from the joint, pieces adhering to adjacent insulation, and particles lodged between joints, conductors, or other parts.
c. Inspect for insufficient solder and unsoldered strands of wire protruding from conductor at joint. Also look for insulation that is stripped back too far from joint, or badly frayed at joint.
d. Inspect for corrosion (verdigris) on copper conductor at joint.

6-79. SWITCHES, CONCENTRIC R-F.

6-80. These r-f switches, which are found in the band-switching circuits of this equipment, are inspected as follows:
a. Examine for bent, weak, broken, or deformed contacts.
b. Check for corrosion and damage to contact plating.
c. Inspect for cracked or broken contact insulation, and other abnormal conditions.
d. Make certain that movable contacts are free to rotate properly throughout entire excursion without binding.

6-81. SWITCHES, ROTARY.
a. Inspect insulation for cracks or breakage and for charring.
b. Check movable and stationary contacts for deformation, breakage, and wear, and for burning, pitting, and corrosion.
c. Inspect terminals for loose, poorly soldered, broken, or corroded connections.
d. Examine mechanical parts for damage or corrosion, and for irregular or rough action.
e. If applicable, examine switch for proper detent action.

6-82. SWITCHES, SENSITIVE.
a. Inspect for cracked, broken, or charred body, and loose, poorly soldered, broken, or corroded terminal connections.
b. Inspect for damaged operating mechanisms. Check by operating plunger, and listening for typical on-and-off click of internal mechanism.

6-83. SWITCHES, TOGGLE.

6-84. Inspect these switches for rough or loose action, cracked, broken, or charred body, loose, poorly soldered, broken, or corroded terminal connections, and loose or missing mounting nuts, bolts, and other parts.

6-85. TRANSFORMERS AND REACTORS.

6-86. Check these parts for signs of excessive heating, physical damage to case, cracked or broken ceramic insulators, and other abnormal conditions. Also check for corroded, poorly soldered, or loose terminals, and loose, broken, or missing mounting hardware.

6-87. TUBES, ELECTRON.
a. Inspect envelope for cracked glass or dented metal, separation from base, and obliterated markings.
b. Check base for cracked, chipped, or broken body or key, and for charring of base between contacts.
c. Inspect for loose tube caps, and deformed, broken, or misaligned base contacts. Also check for corrosion or other damage to contact plating, and for loose or missing solder at tips of tubular-type contacts.

6-88. WIRING.

6-89. Inspect open and laced wiring of chassis, terminal boards, and parts of equipment by checking insulation for physical damage and charring, and check wires for breakage and for improper dress in relation to adjacent wiring or chassis.

SECTION VII
REPAIR AND REPLACEMENT

7-1. INTRODUCTION.

7-2. This section contains essential instructions for the repair or replacement of worn, damaged, or defective parts. Repair instructions include resurfacing of commutators and repairs to finish damage to pole surfaces on rotating machinery. Replacement instructions include replacing brushes.

7-3. Faulty parts are usually detected by inspection in Section VI, by tests performed during reassembly in Sections VIII and IX, or by tests given in Section XI. When the faulty part is repaired or replaced, the new part should be inspected and tested as described in Section VI, VIII, IX, or XI. Instructions for testing relays and the insulation resistance of cables and capacitors are included in this section.

7-4. After a critical part is repaired or replaced, it may be necessary to make some readjustments. For instance, synchronization adjustments of the Autotune system, as described in Section III, paragraph 3-24, would be required after replacement of the Autotune control head. Instructions for seating brushes are also included in this section.

7-5. Repair instructions are not given for such items as are replaced as a unit, since they cannot be economically repaired or overhauled. Replacement instructions are not given where the method is obvious, nor are dismantling or disassembly instructions given in Section III and Section IV repeated in this section. Instructions for replacing special parts on assembled equipments are contained in Section III of this manual and in Section VI of the Handbook of Service Instructions.

7-6. Most of the repair or replacement instructions contained in this section apply to disassembled equipment. For dismantling and disassembling instructions, refer to Section IV.

7-7. A wiring diagram should be drawn before removal of any part requiring unsoldering of several wires. This diagram should show any color coding or markings of the wires, and the approximate location and identity of the terminals to which they are connected. In cases where lacing is to be removed, or where the lead dress is important, this should also be shown.

7-8. The repair of the dynamotor or motors in Radio Sets AN/ARC-27 and AN/ARC-27A consists mainly of replacing defective bearings, armatures, or fields. Brushes are replaced and seated as described under paragraph 7-9. Commutators are resurfaced, if necessary, as described in paragraph 7-11. Field or armature pole surface damage is repaired as described in paragraph 7-14.

7-9. REPLACING BRUSHES.

7-10. Brush replacement data is found in Table XVI in the Handbook of Service Instructions. Replacement of brushes for the dynamotor or other motors disassembled in Section IV is performed during reassembly in Section VIII. Brushes should be replaced in their brush holders with the curved facing of the brush fitting the curved surface of the commutator. When brush caps are replaced, the springs must not be distorted. Brushes should be seated on 100 percent of the arc, and at least 75 percent of the area of the brush. To obtain this brush seating, connect the dynamotor or other motor to a 27.5-volt, d-c supply and allow it to run with no load until the proper seating has been obtained. Run-in time should be from 3 to 5 hours. When satisfactory seating is attained, remove the brushes from their holders, and remove all carbon dust from the motor by careful and thorough use of an air jet supplied with dry, clean air at approximately 25 psi. Replace all brushes in their respective holders.

7-11. RESURFACING COMMUTATORS.

7-12. If a commutator is out of round, or is deeply grooved or pitted, turning in a lathe is required to restore it to a true round, or to remove defects noted. Refer to Table XXIV for pertinent data on the commutators of the motors and the dynamotor in this equipment.

NOTE

Commutators cannot be resurfaced if their diameters after resurfacing will be less than the minimum allowable diameters listed in Table XXIV. The lathe must have a dial indicator mounted on the lathe bed for determining concentricity of the commutators. The dial-indicator reading should not exceed a total of 0.001 inch from true round for all cases.

7-13. After the commutator has been turned down, undercut the insulation with a mica-cutting saw that will give a cut 0.020 to 0.025 inch less than the exact width of the insulation thickness. Carefully remove any slivers of insulation remaining in the slots against the sides of the commutator bars. A piece of hacksaw blade having all but one tooth ground off, and dressed to fit the commutator slots, will serve as a tool for this purpose. Friction-taping part of the blade to form a handle is helpful. Carefully remove any burrs from edges of the bars, taking care not to scratch their faces. Polish the commutator by gentle applications of No. 0000 or finer sandpaper to its surface, while rotating in the lathe at moderate speed commensurate with its

TABLE XXIV. COMMUTATOR RESURFACING LIMITS AND UNDERCUTTING DIMENSIONS

Dynamotor Manufacturer	Commutator Identification	Minimum Allowable Diameter (inches)	Depth of Undercut * (inch)
Continental	Input (27.5V)	0.875	1/32
	Low-voltage (210V)	0.868	1/32
	High-voltage (400V)	1.375	1/32
Wincharger	Input (27.5V)	0.933	1/32
	Low-voltage (210V)	0.908	1/32
	High-voltage (400V)	1.250	1/32
Gothard	Input (27.5V)	0.908	1/32
	Low-voltage (210V)	0.908	1/32
	High-voltage (400V)	1.438	1/32
Electrolux	Input (27.5V)	0.888	1/32
	Low-voltage (210V)	0.868	1/32
	High-voltage (400V)	1.178	1/32

* Width of undercut should be 0.020 to 0.025 inch less than slot width.

size. Blow all dust and particles from slots, windings, and surfaces of entire armature with clean, dry, compressed air at approximately 25 psi.

CAUTION

Do not use emery cloth to polish the commutator.

7-14. RELACQUERING POLE SURFACES.

7-15. If the pole surfaces of the armature or field assemblies are corroded, or if the lacquer finish is damaged, proceed as follows:

a. Remove all defective finish from pole surfaces, using clean, lintless cloth dampened with lacquer thinner.

b. Remove spots of corrosion from pole surfaces, using a fine grade of crocus cloth.

CAUTION

Do not contact bare pole surfaces with bare hands. Wear rubber gloves or finger stalls.

c. Carefully remove dirt with clean, dry, compressed air at approximately 25 psi.

d. Using clean lintless cloth dampened with lacquer thinner, carefully wipe cleaned pole surfaces only.

e. Mask all surfaces not to be treated, then heat assembly to approximately 15°C (27°F) above room temperature.

f. Spray while warm with thin coat of air-drying varnish mixed with enough lacquer thinner to prevent cobwebbing of sprayed surfaces.

g. Bake in ventilated oven at approximately 121°C (250°F) for one hour.

NOTE

When oven is not available, drying may be done at room temperature.

h. Remove armature assembly from oven, and allow it to cool to room temperature. Remove all masking material carefully.

CAUTION

Protect the lacquered surface from damage. Scratching this surface exposes the metal to corrosion.

7-16. CABLES.

7-17. Paragraph 6-46 describes inspection of cables for physical damage and shorted, open, or grounded pins. For cable information when repairing or replacing defective cables, refer to the cable fabrication

data in Section III of the Handbook of Service Instructions. New cable, and those newly repaired, should be tested for continuity between corresponding terminals. The insulation resistance between each terminal and its connector shell, and between each terminal and every other terminal of that connector, should be measured with an insulation tester, such as a Biddle Midget Megger or Interstate type G. The insulation resistance should be at least 100 megohms.

7-18. CAPACITOR INSULATION RESISTANCE.

7-19. GENERAL.

7-20. Capacitors which are suspected of being faulty, or new capacitors which are to be installed in the equipment, should be checked according to the following procedures, as applicable. New capacitors drawn from stock are apt to have low insulation resistance, particularly paper-dielectric capacitors which have been stored under tropical conditions for a long period of time.

7-21. MICA OR CERAMIC-DIELECTRIC CAPACITORS.

7-22. Measure the insulation resistance between terminals, using a megohm bridge such as the Biddle 628-TA. The direct-current potential used for this test should be at least 100 volts but not more than the rated voltage, and the electrification time should not exceed two minutes. The insulation resistance, measured at a temperature between 20°C (68°F) and 25°C (77°F) and a relative humidity between 0 and 80 percent, should be greater than 7500 megohms. (Any condensed moisture on the case of the capacitor should be removed with an air jet before making the test.)

7-23. PAPER-DIELECTRIC CAPACITORS.

7-24. Measure the insulation resistance by following the procedure given in paragraph 7-22. In addition, for capacitors which are sealed in metallic cases (and in which the case is not a terminal), insulation resistance should be measured between each terminal and the case. This resistance should be greater than 3000 megohms.

7-25. RELAYS.

7-26. Damaged relays are usually replaced as individual units, because they cannot be economically repaired. However, for some types of relays, minor faults such as stickiness, sluggishness, poor contact, etc., can be remedied by cleaning or adjustment. Refer to paragraph 5-61 for relay cleaning procedures and Table XXV for relay adjustment data.

7-27. When a relay is replaced, the new relay should be tested before installation. It should be subjected to a dielectric test, as follows:

a. Apply a 60-cycle, rms voltage of twice-rated coil voltage plus 1000 volts between one coil terminal and relay frame.

b. Apply a 60-cycle, rms voltage of twice-rated contact voltage plus 1000 volts between contacts when open.

c. Apply a 60-cycle, rms voltage of 2500 volts between coil circuit and each contact terminal.

TABLE XXV. RELAY ADJUSTMENT DATA

Relay Designation	Relay Location	Pressure Between Closed Contacts (grams)	Clearance Between Open Contacts (inch)
K-501	Spectrum Amplifier Subassembly	25 minimum	0.025 minimum
K-502	Spectrum Amplifier Subassembly	25 minimum	0.025 minimum
K-503	Spectrum Amplifier Subassembly	25 minimum	0.025 minimum
K-504	Spectrum Amplifier Subassembly	25 minimum	0.025 minimum
K-901	Bias Relay Subassembly	25 minimum	0.045 minimum
K-902	Bias Relay Subassembly	20 minimum	0.015 minimum
K-903	Bias Relay Subassembly	20 minimum	0.015 minimum
K-904	Bias Relay Subassembly	20 minimum	0.015 minimum
K-1201	Mechanical Drive Subassembly	25 minimum	*
K-1202	Mechanical Drive Subassembly	25 minimum	*
K-1203	Mechanical Drive Subassembly	25 minimum	*
K-1501	Main Chassis	30 minimum	0.060 minimum
K-1601	Radio Set Control C-626/ARC-27	25 minimum	*
K-1602	Radio Set Control C-626/ARC-27	25 minimum	*

* Adjust relay contact spacing as directed in Section III, paragraph 3-12.

7-28. ANTENNA SWITCHING RELAY E-1401.

7-29. RELAY COIL K-1403. If inspection shows K-1403 to be defective, refer to figures 7-1, 7-2 and 7-3 and replace it using the following procedure:

a. Unsolder the two leads connected to terminal board TB-1401 from the coil.

b. Remove the four Phillips head screws and their shakeproof washers securing K-1403 to the relay E-1401 frame.

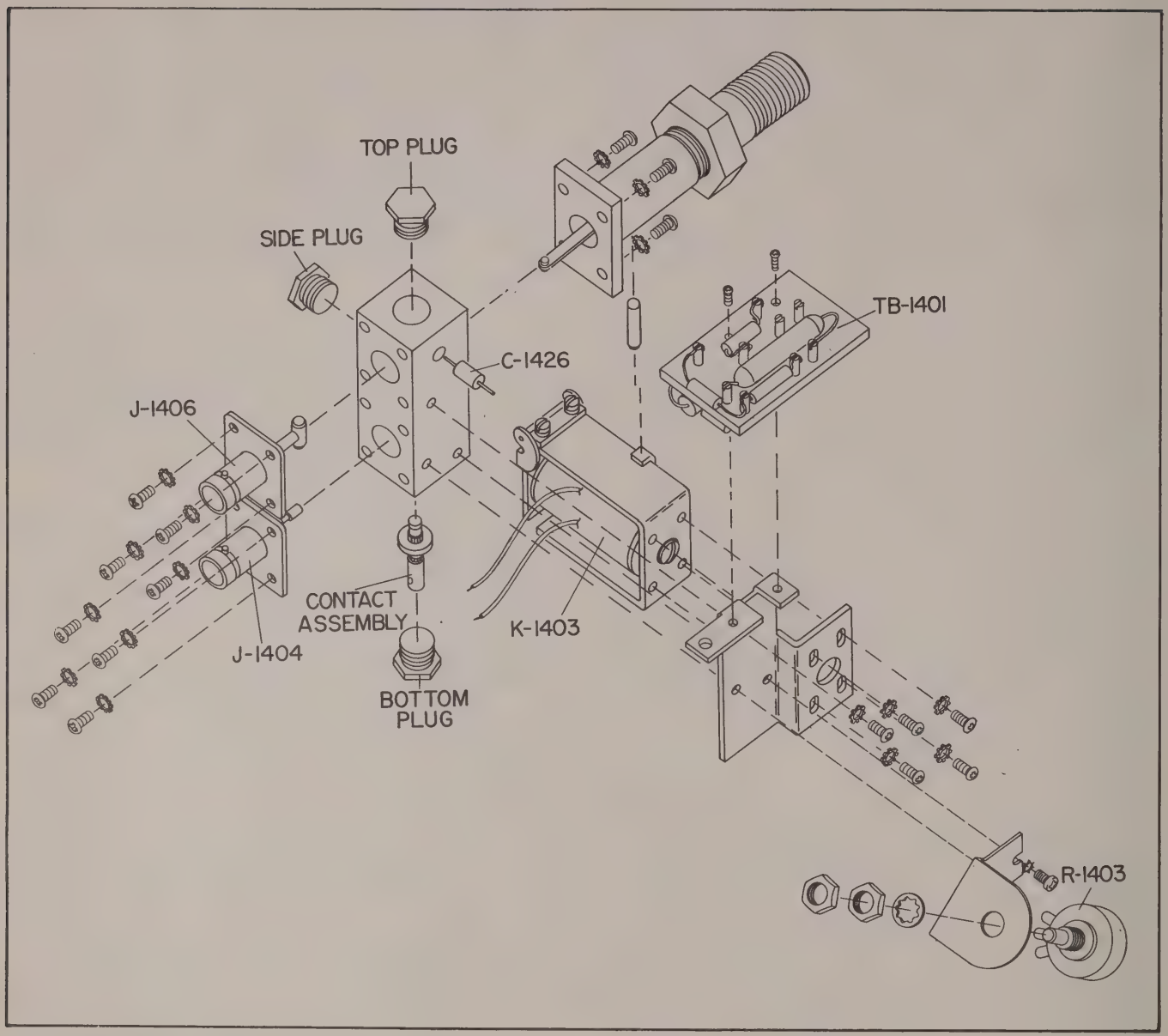


Figure 7-1. Antenna Switching Relay E-1401, Exploded View

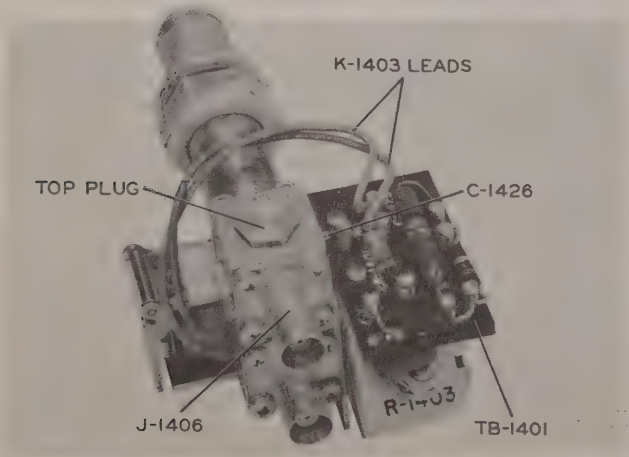


Figure 7-2. Antenna Switching Relay E-1401, Rear View

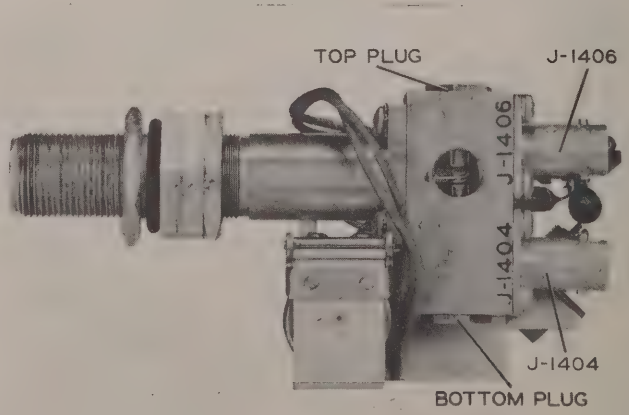


Figure 7-3. Antenna Switching Relay E-1401, Right Side View

c. Remove the defective coil and replace with an operative coil.
d. Replace the four Phillips head screws and their shakeproof washers.
e. Connect the relay leads to a 19-volt d-c source in series with 62 ohms resistance.
f. Adjust K-1403 by moving it up or down until the contact pressure at J-1406, as measured with a spring scale, is a minimum of 25 grams.

7-30. J-1406. If inspection procedures show J-1406 requires replacement, proceed as follows:
a. Remove the top threaded plug (figure 7-2).
b. Remove the two Phillips head screws securing terminal board TB-1401. Reach through the top hole with a pencil tip iron and unsolder the terminal of C-1426 connected to J-1406. Remove C-1426 by pulling TB-1401 away from E-1401.
c. Remove the four Phillips head screws securing J-1406 and remove the defective connector.
d. Insert a new connector into the hole and secure the four Phillips head screws and lockwashers.
e. Insert the terminal of C-1426 through the slot in the top of J-1406.
f. Secure TB-1401 to relay with two Phillips head screws.
g. Reach through the top hole with a pencil tip soldering iron and solder C-1426 to J-1406.
h. Energize relay as described in paragraph 7-29 e.
i. Adjust J-1406 up and down until 25 grams pressure minimum as measured by a leaf scale is required to break contact.

7-31. J-1404. To replace J-1404, proceed as follows:
a. Remove bottom threaded plug.
b. Remove four Phillips head screws securing the connector to relay E-1401.
c. Reach into hole, unsolder the BNC connector from the contact assembly and remove defective connector or contact assembly.
d. Replace connector through hole in contact assembly.
e. Secure connector by replacing four Phillips head screws.
f. Center contact assembly in hole and solder.
g. Adjust contact pressure to a minimum of 25 grams by sliding J-1404 up and down. Secure by tightening the four Phillips head screws.
h. The clearance between open contacts after above adjustments should be 0.020 to 0.040 inch.

SECTION VIII
ASSEMBLY AND TESTING OF ASSEMBLIES AND SUBASSEMBLIES

8-1. INTRODUCTION.

8-2. This section contains instructions for the reassembly of parts into subassemblies and assemblies, and specifies tests to be made prior to reassembly into components.

8-3. Reference is made to exploded views in Section IV for aid in reassembly. The referenced figure and index numbers correspond to those used during disassembly.

8-4. Only those subassemblies disassembled in Section IV will be considered in this section. Reassembly procedures and tests for subassemblies disassembled in Section III will be found in Section III.

8-5. BLOWER MOTOR B-1501.

8-6. REASSEMBLY. Refer to figure 4-3 and proceed as follows:
a. Replace frame screws (16) in cap assembly (13).
b. Replace field assembly (15) over frame screws (16). Connect and solder brush leads (14) to their proper terminals.
c. Wearing rubber gloves or finger stalls, remove prelubricated bearings (9) and (10) from their packages and press them on the shaft of the armature (8).
d. Replace the armature (8).
e. Replace front casting (7) and secure with two slotted nuts (6).
f. Replace brushes (5), brush caps (4) and secure with retainer clips (3).
g. Replace fan (2) and secure to motor shaft by tightening setscrew (1).

8-7. TEST. Connect the leads of blower motor B-1501 to a 27.5-volt d-c source. A properly operating motor will run in a clockwise direction as viewed from the shaft end at 10,000 rpm ±500 rpm.

8-8. BLOWER MOTOR B-1401.

8-9. REASSEMBLY. To reassemble blower motor B-1401 refer to figure 4-5 and proceed as follows:
a. Connect and solder brush leads (16) to their proper terminals.
b. Replace rear casting assembly (17) on field assembly (18) and secure with two screws (15).
c. Wearing rubber gloves or finger stalls, remove prelubricated bearings (19) and (20) and press them onto the armature (14).
d. Replace armature (14).
e. Replace front casting (13).
f. Replace end plate (11) and secure with three screws (10).
g. Replace mounting bracket (9) and secure with four screws (8).
h. Replace brushes (7) and brush caps (6).
i. Secure blower housing (4) to the motor.
j. Replace blower fan (3) and secure by tightening setscrew through exhaust port of blower housing.
k. Replace blower grill (2) and secure with three screws (1).

8-10. TESTS. Manually rotate the blower fans to make certain they do not rub against the blower housings at any point. Connect the leads of blower motor B-1401 to a 27.5-volt d-c source. A properly operating motor will run in the direction indicated on its name plate at 10,000 ±500 rpm and will draw 3.8 amperes current.

8-11. AUTOTUNE MOTOR B-1601 AND AUTOPOSITIONER MOTOR B-1201.

8-12. REASSEMBLY. To reassemble Autotune motor B-1601 and Autopositioner motor B-1201, refer to figure 4-4 and proceed as follows:
a. Replace prelubricated bearings (9) and (10) on armature shaft.
b. Replace armature (7) in field assembly (8).
c. Replace bottom casting (6) and top casting (5) and secure with frame screws (4).
d. Replace brushes (3), rubber brush caps (2) and secure with retainer clips (1).

8-13. TEST. Connect the motor to a 27.5-volt d-c source. A properly operating motor will run in a clockwise direction as viewed from the shaft end. The no load speed of the motor at 19.0 volts is 8,000 rpm and 12,000 rpm at 28.0 volts.

8-14. DYNAMOTOR.

8-15. REASSEMBLY. To reassemble the dynamotor, refer to figure 4-6, 4-7, 4-8 or 4-9 according to the manufacturer and proceed as follows:
a. Wearing rubber gloves or finger stalls, remove prelubricated bearings (18) and (19) from their packages and press them onto the armature shaft.
b. Place the armature (16) in the field assembly (17).
c. Replace the front and rear casting assemblies and secure with two frame bolts (15).
d. Replace the 400-volt brushes (14) and brush caps (13).
e. Replace the 210-volt brushes (12) and brush caps (11).
f. Replace the 27.5-volt brushes (10) and brush caps (9).
g. Replace the end plate (8) when reassembling a Wincharger dynamotor and secure with two Phillips head screws (6).
h. Replace the flexible metal strap (5) and secure by tightening the two bolts securing it.
i. Replace fan casing (4) and secure with two Phillips head screws (3).
j. Replace fan (1) and tighten the setscrew (2) securing the fan to the armature shaft.

SECTION IX
REASSEMBLY AND TESTING OF COMPONENTS

9-1. INTRODUCTION.

9-2. This section contains instructions for reassembling subassemblies or assemblies into components, and for testing the reassembled components. Lubrication instructions are also included.

9-3. Since reassembly procedures are approximately the reverse of those for dismantling and disassembly, references are made to Section IV figures for illustrating the reassembly procedures. The index numbers used are the same as those used during dismantling and disassembly. Most of the procedures referenced in this section are found in Section VI of the Handbook of Service Instructions.

9-4. REASSEMBLY.

9-5. RECEIVER-TRANSMITTER RT-178/ARC-27.

9-6. Because of the physical make up of Receiver-Transmitter RT-178/ARC-27 it is necessary to completely reassemble it before performing performance tests on individual subassemblies. Refer to figures 4-1 and 4-2 and proceed with the following reassembly procedures.

9-7. GUARD RECEIVER SUBASSEMBLY. Reverse the procedures given in paragraph 4-8 to replace the subassembly. The four standoffs, which remain on the main chassis when the subassembly is removed, will guide the subassembly upon replacement.

9-8. Whenever a Guard Receiver Subassembly has been placed in a Receiver-Transmitter RT-178/ARC-27 main chassis in which it has not previously been tuned, the retuning of capacitors, C-803, C-810 and C-811, will usually improve the sensitivity of the receiver. Refer to paragraph 6-77, Handbook of Service Instructions.

9-9. BIAS RELAY SUBASSEMBLY. Reverse the disassembly procedure given in paragraph 4-9 to replace the Bias Relay Subassembly. Be sure to connect the r-f cables to the proper connectors on the Antema Relay Subassembly (E-1401).

9-10. When replacing the subassembly, connect the coaxial cable from the Power Amplifier Subassembly to the top connector of the antenna relay and connect the receiver coaxial cable to the lower connector of the antenna relay. Dress the two cables away from the gears of the Power Amplifier Subassembly to prevent the cables from being scraped by the gears as the tuning mechanism operates.

9-11. POWER AMPLIFIER SUBASSEMBLY. Reverse the disassembly procedure given in paragraph 4-10 to replace the Power Amplifier Subassembly. Be sure that the proper tooth engagement as noted in paragraph 4-10 is obtained. It is assumed that the Mechanical Drive Subassembly has not been operated or rotated by hand in the meantime. Care should be taken in the mesh of the gears before the subassembly is firmly tightened to the main chassis. There should be very little backlash between the gears and no binding. It would be well to check this mesh before removing the subassembly so that it can be returned to the same fit.

9-12. MECHANICAL DRIVE SUBASSEMBLY. Reverse the procedure given in paragraph 4-11 to replace the Mechanical Drive Subassembly. Care should be taken to obtain the correct position when the subassembly is returned to the unit. There should be about twenty-thousandths clearance between the face of the three Oldham couplers on the Mechanical Drive Subassembly and their floating parts. This assumes that the couplers are substantially in contact with the opposite coupler parts on the driven subassembly. After the subassembly has been rigidly fastened down, the Power Amplifier should be moved back again so that the mating gears engage. Carefully check this synchronization both for backlash and to see that the exact tooth is remeshed again with the proper teeth on the opposite subassembly.

9-13. SPECTRUM AMPLIFIER. Reverse the disassembly procedure given in paragraph 4-12 to replace the Spectrum Amplifier. The exact position in which the subassembly is fastened to the main chassis should allow about twenty-thousandths clearance between the faces of the two Oldham couplers and the floating parts. This assumes that the couplers are in contact with the opposite coupler parts on the Mechanical Drive Subassembly. The power plug and the connection to the Power Amplifier Subassembly should be replaced.

9-14. If the gear train of the Spectrum Amplifier Subassembly has turned, and the reference point described in step h, paragraph 4-12, cannot be found, an alternate method of installing the subassembly is presented in paragraph 9-15.

9-15. Before installing any Spectrum Amplifier or Main Receiver R-F Amplifier Subassembly, rotate the tanks of the Spectrum Amplifier and Preamplifier or Main Receiver R-F Amplifier so that the movable inductance rods of the tanks appear directly beneath the access holes in the top of the chassis. After noting the positions of the associated Oldham couplers, rotate each coupler 180 degrees, thus placing the inductance rods on the bottom, away from the holes in the top of the Spectrum Amplifier or Main Receiver R-F Amplifier chassis. To be in the correct position, the bars on the Oldham coupler plates attached to the subassemblies should be horizontal. Since these units can be installed with their tanks 180 degrees out of position, adherence to the above procedure will insure correct installation.

9-16. SPECTRUM OSCILLATOR SUBASSEMBLY. To replace the Spectrum Oscillator Subassembly, make certain that the coaxial connectors J-401 and J-402 engage properly before the subassembly is pushed firmly to the main chassis. Replace the power connector, P-403, and tighten the four captive screws.

9-17. I-F AND AUDIO AMPLIFIER SUBASSEMBLY. To replace the I-F and Audio Amplifier, reverse the procedures given in paragraph 4-14; but be careful to see that the connectors J-302, J-303 and J-305 engage the mating connectors properly before the subassembly is pushed firmly in contact with the main chassis. The four captive screws should then be tightened.

9-18. DYNAMOTOR. To replace the dynamotor, lower it carefully into position to engage the mating power plug, and then push on the central casting until it seats properly. Replace the two band sectors and fasten in place with the two screws. Be sure the rotor turns freely, and is not rubbing on the blower housing, before the dynamotor is again turned on.

9-19. MODULATOR SUBASSEMBLY. When replacing the Modulator Subassembly, avoid catching any of the wires leading to the 20-30 Megacycle I-F Amplifier power plug between the modulator spacing posts and the main chassis. If the fan blade above the subassembly has been removed for any reason, replace the fan blade before returning the Receiver-Transmitter RT-178/ARC-27 to its case. Fasten the fan blade securely to the shaft with the collar down so that the fan blade is not high enough to catch on the case when the case is replaced, or low enough to catch on the 12AT7 tube shields when the fan rotates. When a different Modulator Subassembly is installed on the main chassis, the modulation potentiometer, R-703, should be readjusted so that 1.0 volt (open circuit voltage) of 1000 cycle audio signal into a dummy microphone produces the required 100 percent modulation.

9-20. MAIN RECEIVER R-F AMPLIFIER SUBASSEMBLY. When replacing a Main Receiver R-F Amplifier Subassembly, the movable inductance rods of the tanks should be positioned to the bottom of the chassis, as described in paragraph 5-42 k, Handbook of Service Instructions. This prevents replacing the Main Receiver R-F Amplifier with its tanks turned 180 degrees from the correct position. Inspect the spring clip which connects to the contact on the 20-30 Megacycle I-F Amplifier to be sure that it will make good connection. This may prevent subsequent troubles from this source. Proper Oldham coupler fit is described in paragraph 5-41, Handbook of Service Instructions. The audio potentiometer, R-385, must be readjusted to the required specifications when a different Main Receiver R-F Amplifier is placed in the main chassis.

9-21. 20-30 MEGACYCLE AMPLIFIER SUBASSEMBLY. To replace the 20-30 Megacycle Amplifier Subassembly reverse the procedures given in paragraph 4-18. Take care that connector J-302 engages properly with J-303 before the subassembly is pushed firmly into position. Synchronization problems will be avoided if the gear train on the subassembly is set properly before replacement in the set as noted in paragraph 4-18. At the reference frequency of 200.0 megacycles, the slug mounting table will be at the bottom of its travel, that is, with the powdered iron slug in the coils. The power connector, J-1504, should be replaced as the subassembly is lowered in place. Tighten the captive screws before operating the set again. The mesh between the subassembly gear and the driving gear on the Autopositioner should be checked to see that there is no binding. A small amount of backlash at this point is not objectionable.

9-22. Two holes in the "B" bank crystal cover of the amplifier aid in synchronization of this unit, making it possible to see the position of switch tabs without removing the cover. A small trouble shooting light can be projected into the side hole. The tabs can then be seen by looking down into the top hole from directly over the unit. At any frequency ending in 0.0 megacycle, the cam roller on the 20-30 Megacycle I-F Amplifier should have just started up the cam after having passed the lowest point; and a rear tab on the control switch, S-202, should be exactly between the two contacts directly below the inspection hole. If this tab is not evident, the amplifier is not in synchronization. See paragraph 6-53 Handbook of Service Instructions for information on synchronization procedure.

9-23. TESTS.

9-24. Since each subassembly of Receiver-Transmitter RT-178/ARC-27 is an integral part of the complete unit, an individual test for each subassembly cannot be given. Therefore, in order to test a single subassembly of Receiver-Transmitter RT-178/ARC-27, it is necessary to insert the subassembly to be tested into an operative Receiver-Transmitter RT-178/ARC-27 as directed in paragraphs 3-4 and 3-6 Handbook of Overhaul Instructions. The subassembly may then be tested by applying applicable portions of Table XXI, Handbook of Service Instructions.

9-25. LUBRICATION.

9-26. Lubricate this equipment as directed in paragraph 5-49, Handbook of Service Instructions.

SECTION X
FINAL REASSEMBLY

10-1. REASSEMBLY REFERENCES.

10-2. This section normally contains instructions for final reassembly into a complete equipment, ready for inspection and final test. Because of the physical make-up of Radio Set AN/ARC-27 or AN/ARC-27A, final reassembly must be accomplished before performing tests in Section IX. For this reason, instructions for final reassembly of the equipment are given in Section IX, and are not presented in this section.

SECTION XI
INSPECTION, TESTING, AND PACKAGING

11-1. INTRODUCTION.

11-2. This section contains instructions for inspection and testing of newly overhauled Radio Set AN/ARC-27 or AN/ARC-27A. Once the equipment is reassembled and the tuned circuits aligned in accordance with Section IX, various checks are performed in this section, including minimum performance checks of receiver sensitivity, selectivity, and transmitter power output. Appropriate reference is made to procedures for making these checks in Section V of the Handbook of Service Instructions.

11-3. When the checks and adjustments introduced in paragraph 11-4 have been completed, and normal indications obtained throughout, the equipment meets the minimum performance requirements. Paragraphs 11-12 through 11-14 provide instructions for a two-hour operating run to check for unstable or erratic operation.

11-4. INSPECTION.

11-5. The reassembled equipment is visually inspected as follows:

a. Check each component for scratches, dents, and other damage which may have occurred during reassembly.

b. See that all cabling is correct, and all cable fittings are secure.

c. Check to see that equipment is properly secured with all necessary screws and safety wiring.

d. Make certain that all fasteners work properly.

e. Be sure that equipment is complete.

f. Check for completion of all repairs and replacements made during overhaul.

NOTE

Marking of equipments required by Government T.O.'s or other instructions, to indicate overhaul or the incorporation of changes, shall be applied during inspection and test (if not previously applied to subassemblies, assemblies, or components during overhaul and assembly).

11-6. PERFORMANCE CHECKS.

11-7. These are checks of the overall performance of the Radio Set AN/ARC-27 or AN/ARC-27A performed after all visual checks in paragraph 11-4 have been made. Checks are made to insure that the dynamotor is operating properly, and the output voltages are correct. Receiver sensitivity and selectivity checks are made, using procedures found in the Handbook of Service Instructions. Transmitter power output, modulation, and tracking checks are also referenced in the Handbook of Service Instructions. If all indications are normal, the equipment meets minimum performance standards, and it is then subjected to a two-hour operating test, paragraph 11-12. In cases where the indications are not normal, make a brief visual inspection of the defective part in an effort to locate the cause of the trouble, and then refer to the appropriate trouble-isolation procedure in Section VI of the Handbook of Service Instructions.

11-8. DYNAMOTOR AND FILTER.

11-9. Refer to the Handbook of Service Instructions, for location of test points used when checking the output voltages of the dynamotor. Proceed with Table XXVI.

TABLE XXVI. PERFORMANCE CHECK, DYNAMOTOR AND FILTER

Step	Procedure	Normal Indication
1	Lock all Autotune locking keys, rotate POWER to ON, and check to make certain that dynamotor is running properly.	Dynamotor runs smoothly, with normal vibration and noise.

TABLE XXVI. PERFORMANCE CHECK, DYNAMOTOR AND FILTER (Cont.)

Step	Procedure	Normal Indication
2	Check 210-volt output of dynamotor as follows: with d-c input of 27.5V, and using d-c voltmeter, measure voltage between pin 7 of plug P-1109 and ground.	Meter indicates slightly over 210 volts.
3	Check 400-volt output of dynamotor as follows: with d-c input of 27.5V, and using d-c voltmeter, measure voltage between pin 8 of plug P-1109 and ground.	Meter indicates slightly over 400 volts.

11-10. RECEIVER-TRANSMITTER RT-178/ARC-27.

11-11. Refer to paragraph 3-5 Handbook of Service Instructions for a minimum performance test to be performed on an overhauled Radio Set AN/ARC-27 or AN/ARC-27A.

11-12. TWO-HOUR OPERATING TEST.

11-13. After the performance checks have been completed, and all indications are normal, place the chassis of the Receiver-Transmitter RT-178/ARC-27 in its dust cover. The equipment is then operated for a period of not less than two hours with power ON, and the transmitter is not keyed during most of the test. A new two-hour test must be made if any part is repaired or replaced before the original two-hour test is completed.

11-14. During the two-hour test, the equipment is checked for intermittent, erratic, or unstable operation, or any other condition indicating faulty operation. Lightly jar the chassis to check for loose connections, intermittent shorts, microphonic tubes, and similar faults by tapping it from several directions with a rubber mallet, observing receiver output and indications of intermittent or unstable operation. Repeat this check with transmitter keyed while observing meter readings for similar indications.

11-15. PACKAGING.

11-16. For packaging instructions refer to paragraph 3-37 Handbook of Service Instructions.

SECTION XII
DIFFERENCE DATA SHEETS

12-1. INTRODUCTION.

12-2. Overhaul Instructions for the models included in this section are the same as the procedures for Radio Sets AN/ARC-27 and AN/ARC-27A except for the specific differences noted by the applicable Difference Data Sheet. Sections I through XI contain complete overhaul instruction information for Radio Set AN/ARC-27 or Radio Set AN/ARC-27A, manufactured and supplied under Contracts NOas 10444, 10977, 12161, 51-284, 51-285, 51-618, 51-619, 51-620, 51-1155, 52-320, 52-349, 52-742, 52-1045, 52-1115, 53-267, 53-293, 53-413, and 53-896.

INDEX OF MODELS COVERED BY DIFFERENCE DATA SHEETS

NOMENCLATURE	PAGE
Radio Set Control C-1703/ARC-27A	69
Radio Set Control C-1704/ARC-27A	69
Radio Set Control C-1705/ARC-27A	69

RADIO SET CONTROLS C-1703/ARC-27A, C-1704/ARC-27A, AND C-1705/ARC-27A SUPPLIED ON CONTRACTS NOas 52-320, NOas 52-349, NOas 52-1115, NOas 53-293, NOas 53-896, AND NOas 54-575

The instructions contained in this handbook for Radio Set Controls C-1015/ARC-27A, C-1024/ARC-27A, and C-1025/ARC-27A apply to Radio Set Controls C-1703/ARC-27A, C-1704/ARC-27A, and C-1705/ARC-27A, respectively, except for the differences listed below.

Radio Set Control C-1015/ARC-27A uses connector J-3101 designated AN 3101A-28-21P
Radio Set Control C-1703/ARC-27A uses connector J-3101 designated AN 3106A-28-21P

Radio Set Control C-1024/ARC-27A uses connector J-3401 designated AN 3101A-36-8P
Radio Set Control C-1704/ARC-27A uses connector J-3401 designated AN 3106A-36-8P

Radio Set Control C-1025/ARC-27A uses connector J-3501 designated AN 3101A-24-28P
Radio Set Control C-1705/ARC-27A uses connector J-3501 designated AN 3106A-24-28P

APPENDIX A

INDEX

Title	Illus.	Adjust-ment	Cleaning	Dis-mantling	Dis-Assy.	Inspection	Re-Assy.	Removal	Repair	Replace-ment	Tests
Autopositioner Motor B-1201	33	--	41	32	32	47	62	--	57	57	62
Autotune Motor B-1601	33	--	41	32	32	47	62	--	57	57	62
Bias Relay Subassembly	29	--	40	27	--	46	--	--	--	63	64
Blower Motor B-1401	34	--	41	33	33	47	62	--	57	57	62
Blower Motor B-1501	32	--	41	31	31	47	62	--	57	57	62
Dynamotor	35	--	40	31	32	47	62	31	57	64	65
Guard Receiver Subassembly	29	--	40	27	--	46	--	--	--	63	64
I-F and Audio Amplifier	30	--	40	31	--	46	--	--	--	64	64
Main Receiver R-F Amplifier Subassy.	30	--	40	31	--	46	--	--	--	64	64
Mechanical Drive Subassembly	9	5	40	28	3	47	8	--	6	63	64
Modulator	30	--	40	31	--	46	--	--	--	64	64
Mounting MT-4/ARR-2	xi	--	40	--	--	47	--	--	--	--	--
Mounting MT-821/ARC-27	xi	--	40	--	--	47	--	--	--	--	--
Mounting MT-822/ARC-27	ix	--	40	--	--	47	--	--	--	--	--
Mounting MT-1075/ARC-27	xi	--	40	--	--	47	--	--	--	--	--
Power Amplifier Subassembly	29	--	40	28	--	46	--	--	--	63	64
Radio Set Control C-626/ARC-27	10	5	40	--	11	47	14	--	6	--	14
Radio Set Control C-627/ARC-27	x	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-628/ARC-27	ix	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-628A/ARC-27	x	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-853/ARC-27	x	--	40	--	--	46	--	--	--	--	--

INDEX (Cont.)

Title	Illus.	Adjust-ment	Cleaning	Dis-mantling	Dis-Assy.	Inspection	Re-Assy.	Removal	Repair	Replace-ment	Tests
Radio Set Control C-868/ARC-27	x	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-905/ARC-27	x	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-906/ARC-27	x	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-911/ARC-27	x	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-912/ARC-27	x	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-913/ARC-27	x	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-914/ARC-27	x	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-1015/ARC-27A	25/ 26	15	40	--	19	46	24	--	19	--	24
Radio Set Control C-1024/ARC-27	xii	--	40	--	--	46	--	--	--	--	--
Radio Set Control C-1025/ARC-27A	xii	--	40	--	--	46	--	--	--	--	--
Receiver-Transmitter RT-178/ARC-27	29	66	40	27	--	46	63	--	--	--	66
Spectrum Amplifier	29	--	40	28	--	46	--	--	--	63	64
Spectrum Oscillator Subassembly	30	--	40	28	--	46	--	--	--	64	64
20-30 Megacycle Amplifier	30	--	40	31	--	46	--	--	--	64	64